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SECTION 1

SUMMARY

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NEW FUNCTIONS OF DVD-RECORDER

• SUMMARY OF PRODUCT

- RECORDING FUNCTION OF DVD-RW AND DVD-R SPECIFICATIONS
 - DVD-RW: VIDEO MODE AND VR MODE RECORD AVAILABLE
 - DVD-R :VIDEO MODE RECORD AVAILABLE
- DIGITAL DUBBING FUNCTION OF DV CAMCORDER BY USING DV TERMINAL (IEEE1394)
 - RECORD, PLAY, FF/REW FUNCTION BY REMOTE CONTROL OF DV CAMCORDER
- DVD PROGRESSIVE PLAY RESPONSE
- VARIOUS FUNCTION RESPONSE OF DVD RECORDING (DISC NAVIGATION AND CONVENIENT PLAY, EDIT FUNCTION)
- OUTSIDE INPUT AND TV RECORDING AVAILABLE
 - RECORDING SCREEN QUALITY :VR(HQ, SQ, LQ), VIDEO(HQ, SQ)
- TV RESERVE RECORDING FUNCTION (AUTO MODE SETTING AVAILABLE FOR RECORDING IN ACCORDANCE WITH THE REMAINING DISC SPACE IN RESERVATION)

SUMMARIZED EXPLANATION OF MAIN FUNCTION

- DVD RECORDING FUNCTION(VR MODE RECORD / VIDEO MODE RECORD)
- 1) VR MODE RECORD : MANUAL MODE RECORDING IN ACCORDANCE WITH VARIOUS EDITING FUNCTION, REMAINING DISC SPACE AND PROGRAM TIME DVD-RW DISC RECORDED IN THE VR MODE CAN BE PLAYED WITH A DVD PLAYER CORRESPONDING TO THE DVD-RW THERE IS ALSO A PLAYER TO BE PLAYED THROUGH FINALIZING. FOR THE DVD-RW, RECORDING AND EDITING IS AVAILABLE AT THE SAME DEVICE EVEN AFTER FINALIZING.
 - 2) VIDEO MODE RECORDING : THERE IS NO EDITING FUNCTION SUCH AS VR MODE RECORDING BUT VIDEO MODE RECORDING IS PLAYED IN A GAME DEVICE (FOR EXAMPLE, "PLAY STATION 2") WITH PC, DVD PLAY FUNCTION CORRESPONDING TO DVD PLAYER, CAR DVD, DVD-ROM. TO PLAY IN ANOTHER DEVICE, FINALIZING IS REQUIRED. RECORDING, EDITING AND EDITING IS NOT POSSIBLE AFTER FINALIZING. HOWEVER, RECORDING IS ALLOWED AT THE DVD-RW DISC IF ERASING THE TITLE FINALLY RECORDED AFTER FINALIZING.
 - 3) RECORDING MODE INITIALIZATION (A KIND OF FORMATTING): BEGINS INITIALIZATION AFTER SELECTING RECORDING MODE AS VR OR VIDEO MODE BY USING INITIALIZATION FUNCTION OF THE DISC SETTING MENU. INITIALIZES DEFAULT AS VR MODE FOR DVD-RW. RECORDS IT AS VIDEO MODE WITHOUT INITIALIZATION FOR VIDEO MODE.
 - 4) FINALIZE: BEGINS FINALIZE AT THE DISC SETTING MENU DURING STOP.

PRODUCT SAFETY SERVICING GUIDELINES FOR VIDEO PRODUCTS

IMPORTANT SAFETY NOTICE

This manual was prepared for use only by properly trained audio-video service technicians.

When servicing this product, under no circumstances should the original design be modified or altered without permission from LG Electronics Corporation. All components should be replaced only with types identical to those in the original circuit and their physical location, wiring and lead dress must conform to original layout upon completion of repairs.

Special components are also used to prevent x-radiation, shock and fire hazard. These components are indicated by the letter "x" included in their component designators and are required to maintain safe performance. No deviations are allowed without prior approval by LG Electronics Corporation.

Circuit diagrams may occasionally differ from the actual circuit used. This way, implementation of the latest safety and performance improvement changes into the set is not delayed until the new service literature is printed.

CAUTION: Do not attempt to modify this product in any way. Never perform customized installations without manufacturer's approval. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury.

Service work should be performed only after you are thoroughly familiar with these safety checks and servicing guidelines.

GRAPHIC SYMBOLS



The exclamation point within an equilateral triangle is intended to alert the service personnel to important safety information in the service literature.



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the service personnel to the presence of noninsulated "dangerous voltage" that may be of sufficient magnitude to constitute a risk of electric shock.



The pictorial representation of a fuse and its rating within an equilateral triangle is intended to convey to the service personnel the following fuse replacement caution notice:

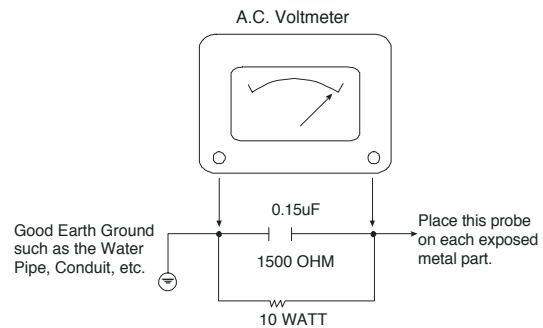
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

SERVICE INFORMATION

While servicing, use an isolation transformer for protection from AC line shock. After the original service problem has been corrected, make a check of the following:

FIRE AND SHOCK HAZARD

1. Be sure that all components are positioned to avoid a possibility of adjacent component shorts. This is especially important on items transported to and from the repair shop.
2. Verify that all protective devices such as insulators, barriers, covers, shields, strain reliefs, power supply cords, and other hardware have been reinstalled per the original design. Be sure that the safety purpose of the polarized line plug has not been defeated.
3. Soldering must be inspected to discover possible cold solder joints, solder splashes, or sharp solder points. Be certain to remove all loose foreign particles.
4. Check for physical evidence of damage or deterioration to parts and components, for frayed leads or damaged insulation (including the AC cord), and replace if necessary.
5. No lead or component should touch a high current device or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces must be avoided.
6. After reassembly of the set, always perform an AC leakage test on all exposed metallic parts of the cabinet (the channel selector knobs, antenna terminals, handle and screws) to be sure that set is safe to operate without danger of electrical shock. **DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST.** Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner: Connect a 1500 ohm, 10 watt resistor, paralleled by a .15 mfd 150V AC type capacitor between a known good earth ground water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and .15 mfd capacitor. Reverse the AC plug by using a non-polarized adaptor and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.75 volts RMS. This corresponds to 0.5 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



TIPS ON PROPER INSTALLATION

1. Never install any receiver in a closed-in recess, cubbyhole, or closely fitting shelf space over, or close to, a heat duct, or in the path of heated air flow.
2. Avoid conditions of high humidity such as: outdoor patio installations where dew is a factor, near steam radiators where steam leakage is a factor, etc.
3. Avoid placement where draperies may obstruct venting. The customer should also avoid the use of decorative scarves or other coverings that might obstruct ventilation.
4. Wall- and shelf-mounted installations using a commercial mounting kit must follow the factory-approved mounting instructions. A product mounted to a shelf or platform must retain its original feet (or the equivalent thickness in spacers) to provide adequate air flow across the bottom. Bolts or screws used for fasteners must not touch any parts or wiring. Perform leakage tests on customized installations.
5. Caution customers against mounting a product on a sloping shelf or in a tilted position, unless the receiver is properly secured.
6. A product on a roll-about cart should be stable in its mounting to the cart. Caution the customer on the hazards of trying to roll a cart with small casters across thresholds or deep pile carpets.
7. Caution customers against using extension cords. Explain that a forest of extensions, sprouting from a single outlet, can lead to disastrous consequences to home and family.

SERVICING PRECAUTIONS

CAUTION : Before servicing the DVD Recorder covered by this service data and its supplements and addends, read and follow the **SAFETY PRECAUTIONS**. **NOTE :** if unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions in this publications, always follow the safety precautions.

Remembers Safety First:

General Servicing Precautions

1. Always unplug the DVD Recorder AC power cord from the AC power source before:
 - (1) Removing or reinstalling any component, circuit board, module, or any other assembly.
 - (2) Disconnection or reconnecting any internal electrical plug or other electrical connection.
 - (3) Connecting a test substitute in parallel with an electrolytic capacitor.

Caution : A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Do not spray chemicals on or near this DVD Recorder or any of its assemblies.
3. Unless specified otherwise in this service data, clean electrical contacts by applying an appropriate contact cleaning solution to the contacts with a pipe cleaner, cotton-tipped swab, or comparable soft applicator. Unless specified otherwise in this service data, lubrication of contacts is not required.
4. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.
5. Do not apply AC power to this DVD Recorder and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
6. Always connect test instrument ground lead to the appropriate ground before connection the test instrument positive lead. Always remove the test instrument ground lead last.

Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect an insulation resistance meter(500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts (Note 1) should be more than 1M-ohm.

Note 1 : Accessible Conductive Parts including Metal panels, Input terminals, Earphone jacks, etc.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field effect transistors and semiconductor chip components.

The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified a "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charge sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil, or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

Caution : Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Normally harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

SPECIFICATIONS

• GENERAL

Power requirements	AC 200-240V, 50/60 Hz
Power consumption	44W
Dimensions (approx.)	430 X 92 X 382.5 mm (16.9 x 3.6 x 15 inches) (w x h x d)
Mass (approx.)	6.4 kg (14.1 lbs)
Operating temperature	5°C to 35°C (41°F to 95°F)
Operating humidity	5 % to 90 %
Television system	PAL B/G colour system
Recording format	PAL

• RECORDING

Recording format	DVD VideoRecording, DVD-VIDEO
Recordable discs	DVD-ReRecordable, DVD-Recordable
Recordable time	Approx. 1 hour (HQ mode), 2 hours (SQ mode), 4 hours (LQ mode)

Video recording format

Sampling frequency	27MHz
Compression format	MPEG 2

Audio recording format

Sampling frequency	48kHz
Compression format	Dolby Digital

• DVD SPECIFICATIONS

Laser system	Semiconductor laser
Frequency response	DVD (PCM 48 kHz): 8 Hz to 22 kHz, CD: 8 Hz to 20 kHz
Signal-to-noise ratio	More than 100 dB
Harmonic distortion	Less than 0.008%
Dynamic range	More than 95 dB

• INPUTS

AERIAL IN	Aerial input, 75 ohms
VIDEO IN	1.0 Vp-p 75 ohms, sync negative, RCA jack x 2 / SCART
AUDIO IN	0 dBm more than 47 kohms, RCA jack (L, R) x 2 / SCART
DV IN	4 pin (i.LINK/IEEE 1394 standard)

• OUTPUTS

VIDEO OUT	1 Vp-p 75 Ω, sync negative, RCA jack x 1
S-VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω, negative sync, Mini DIN 4-pin x 1 (C) 0.3 V (p-p) 75 Ω
COMPONENT VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω, negative sync, RCA jack x 1 (Pb)/(Pr) 0.7 V (p-p), 75 Ω, RCA jack x 2
Audio output (digital audio)	0.5 V (p-p), 75 Ω, RCA jack x 1
Audio output (optical audio)	5 V (p-p), 75 Ω, Optical connector x 1
Audio output (analog audio)	2.0 Vrms (1 KHz, 0 dB), 600 Ω, RCA jack (L, R) x 1 / SCART

• ACCESSORY:

Video cable	1	Audio cable	1
RF Coaxial Cable.....	1	Blank DVD-R disc	2
Remote control	1	Batteries	2

SECTION 2

CABINET & MAIN CHASSIS

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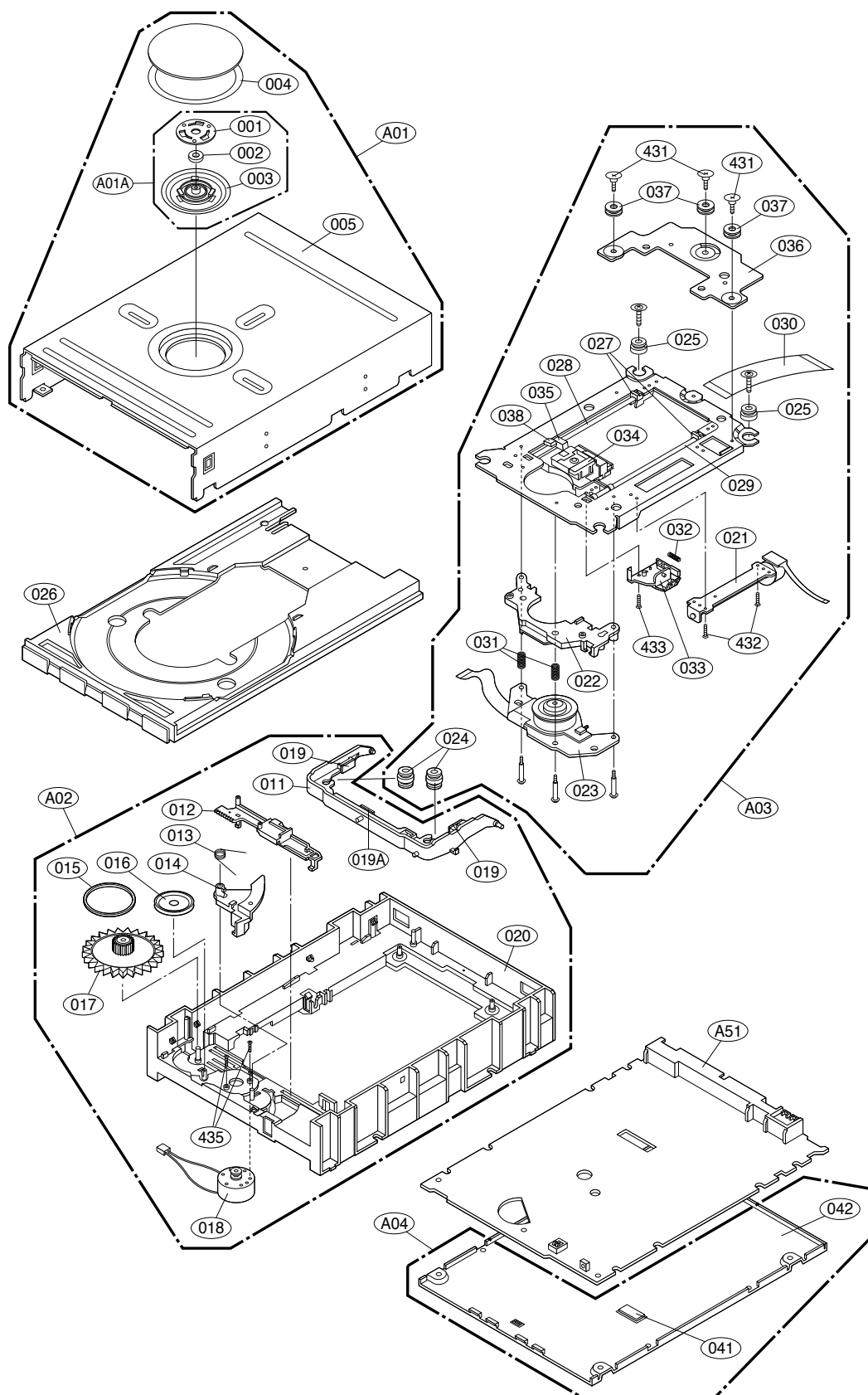
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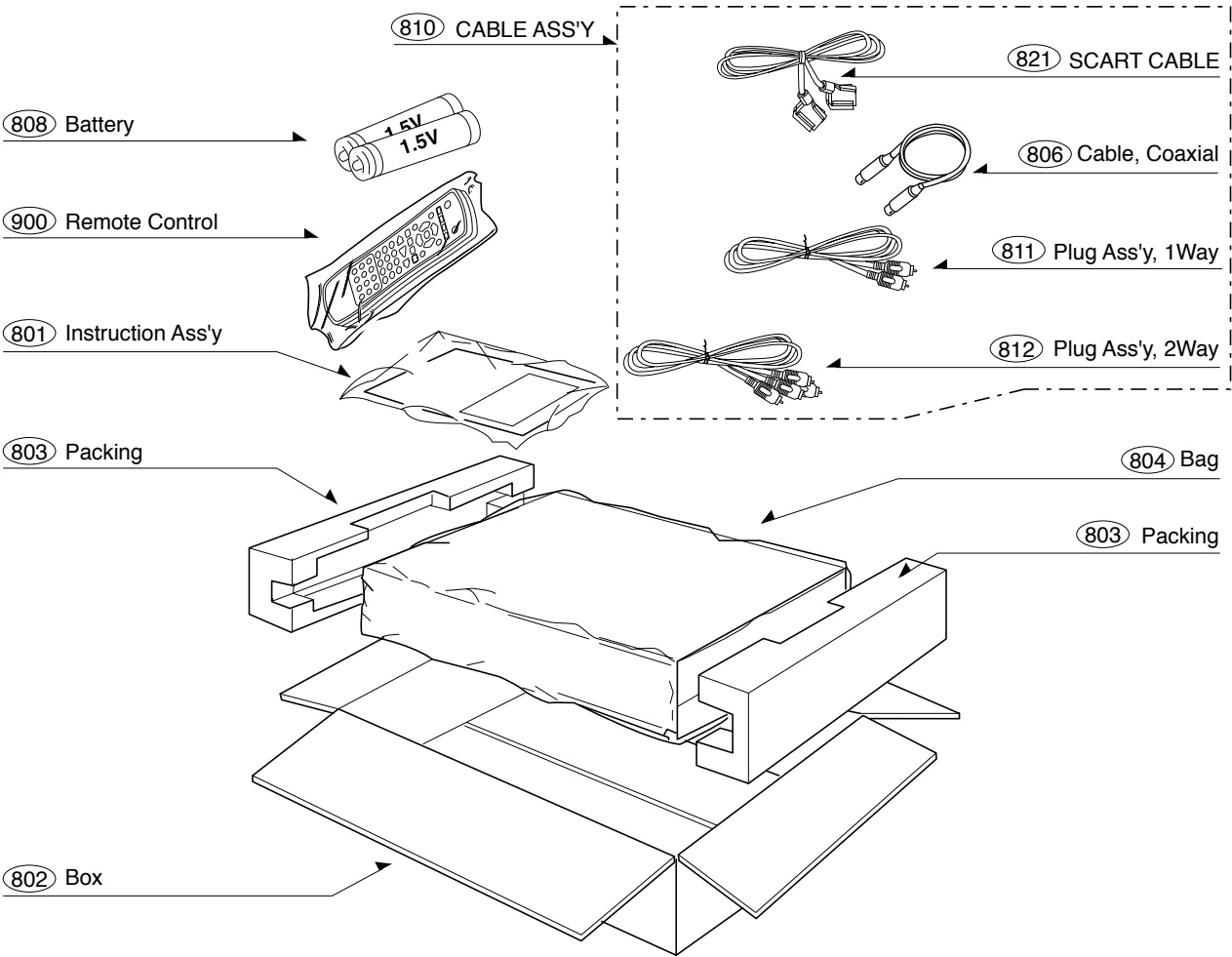
A	B	C	D
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2. DECK MECHANISM SECTION(RL-01A)



3. Packing Accessory Section



SECTION 3

ELECTRICAL

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RL-01A LOADER PART

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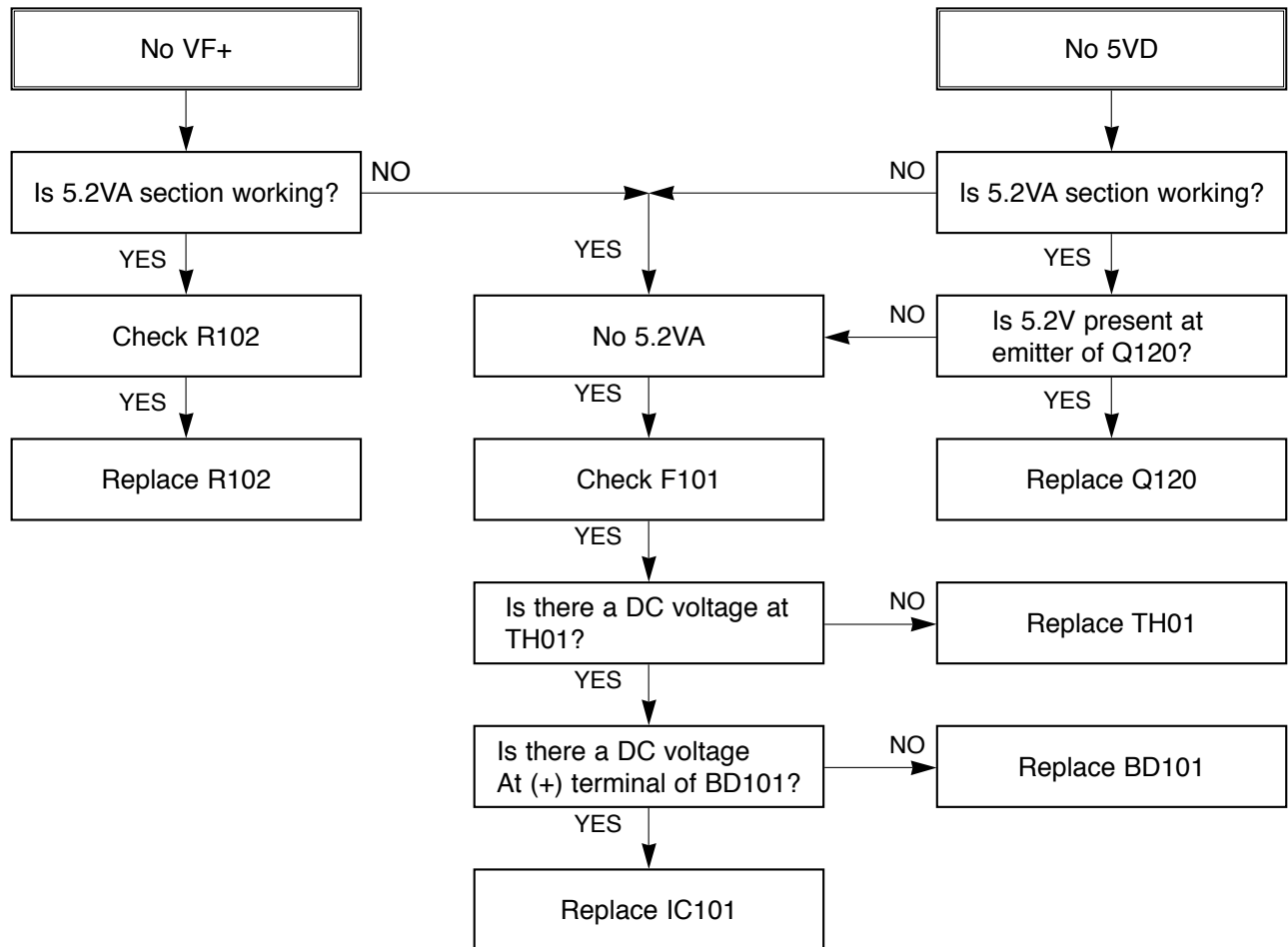
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VDR PART

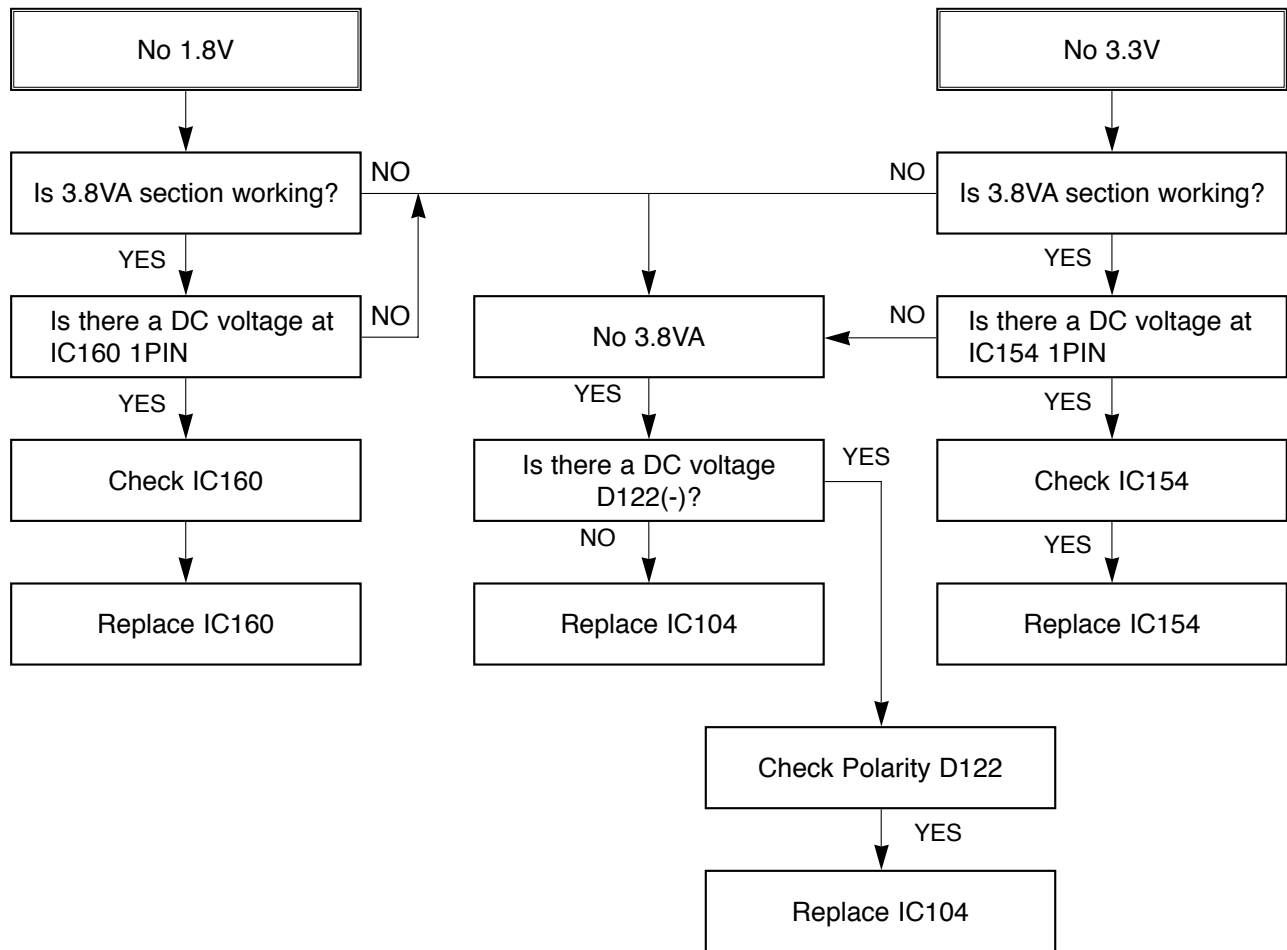
ELECTRICAL TROUBLESHOOTING GUIDE

Power Section

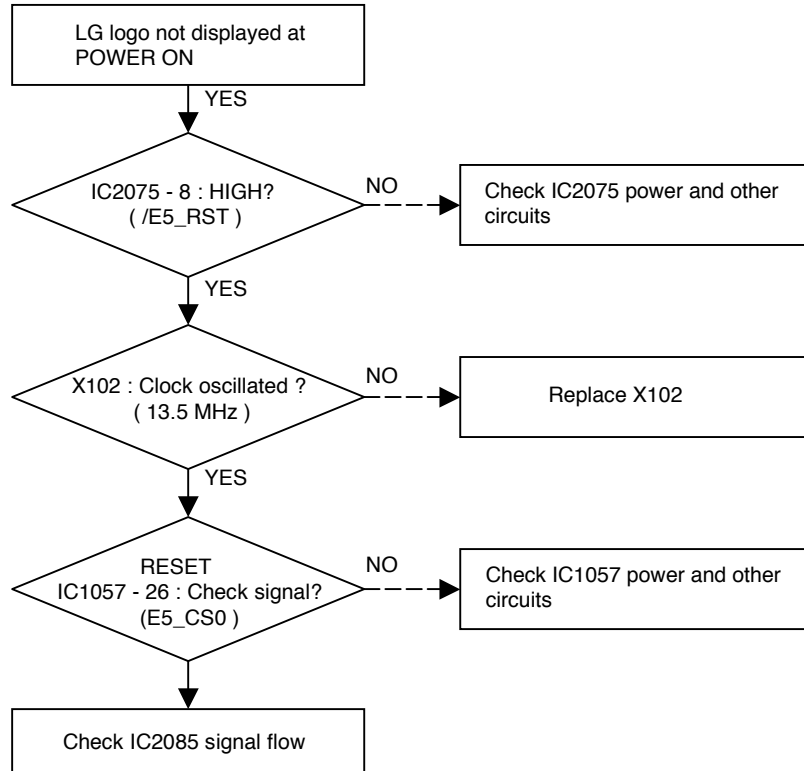
(Power (SMPS) Circuit (Part 1))



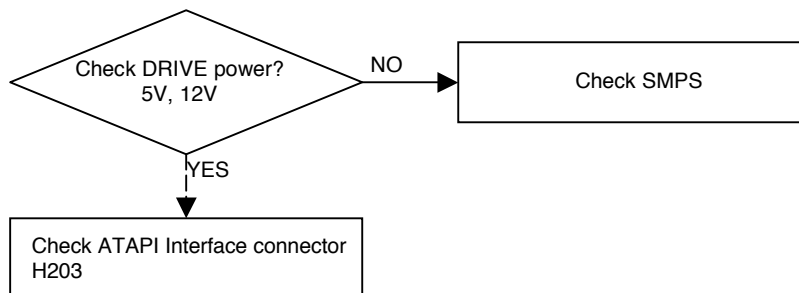
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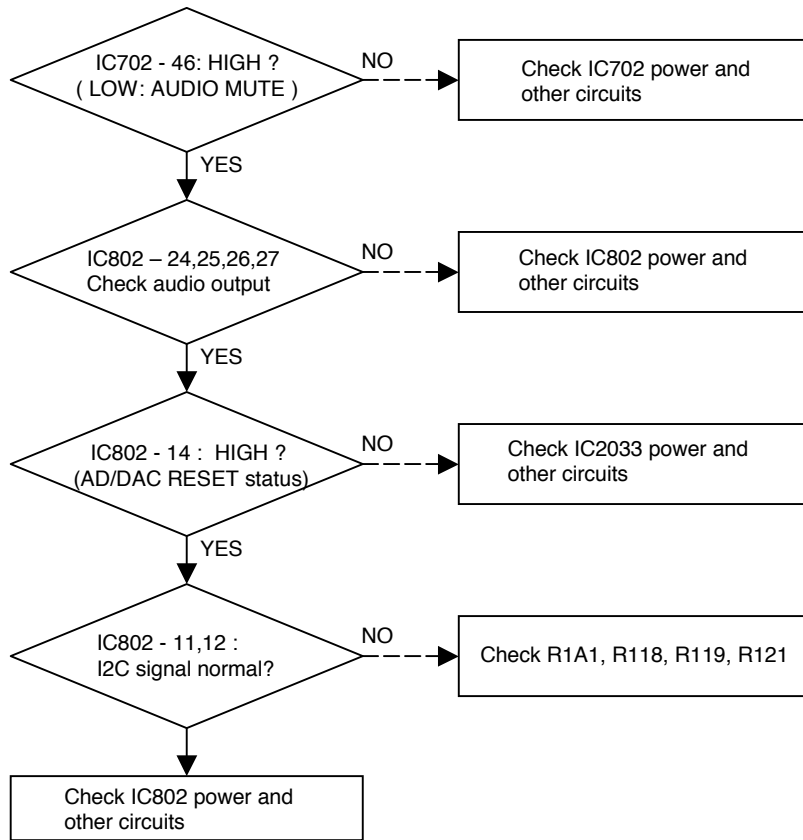
SYSTEM Section



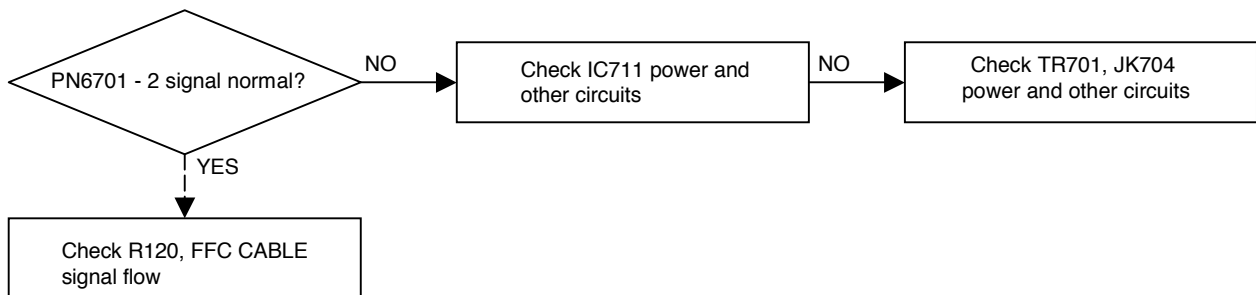
DISC not recognized



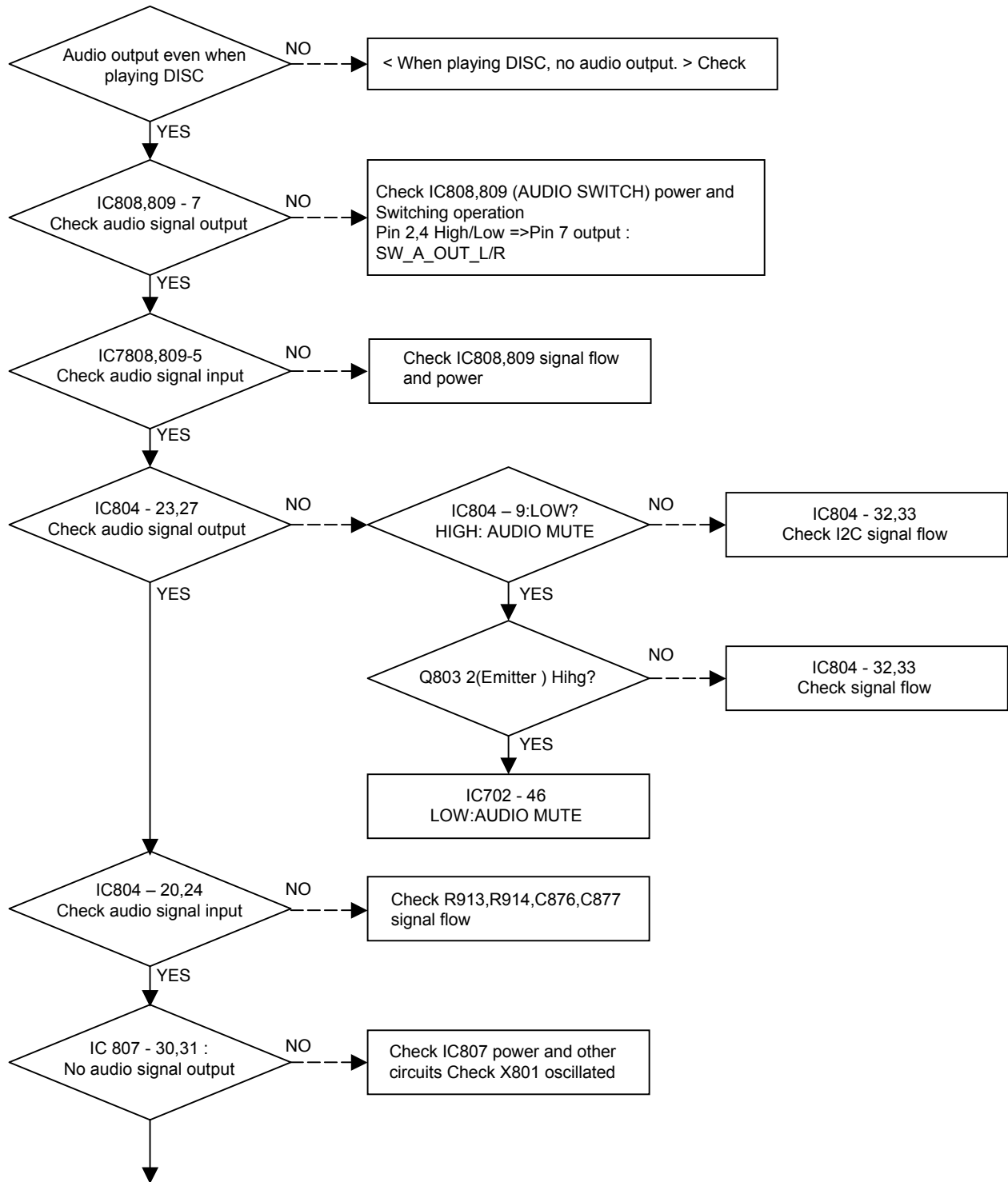
When playing DISC, no audio output

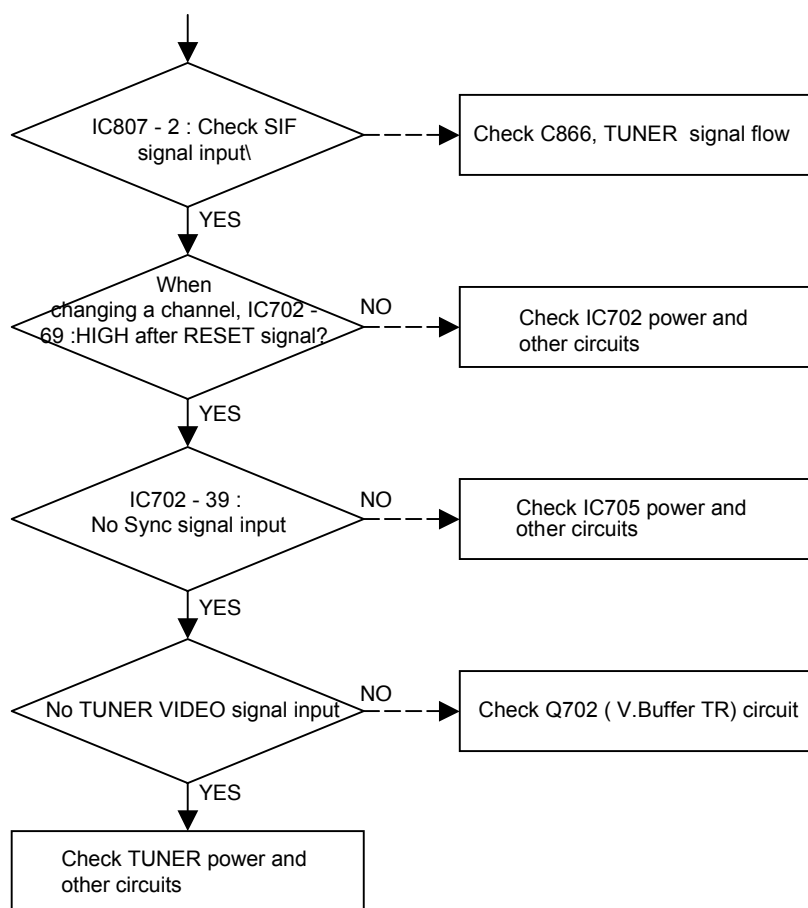


No OPTICAL / DIGITAL output

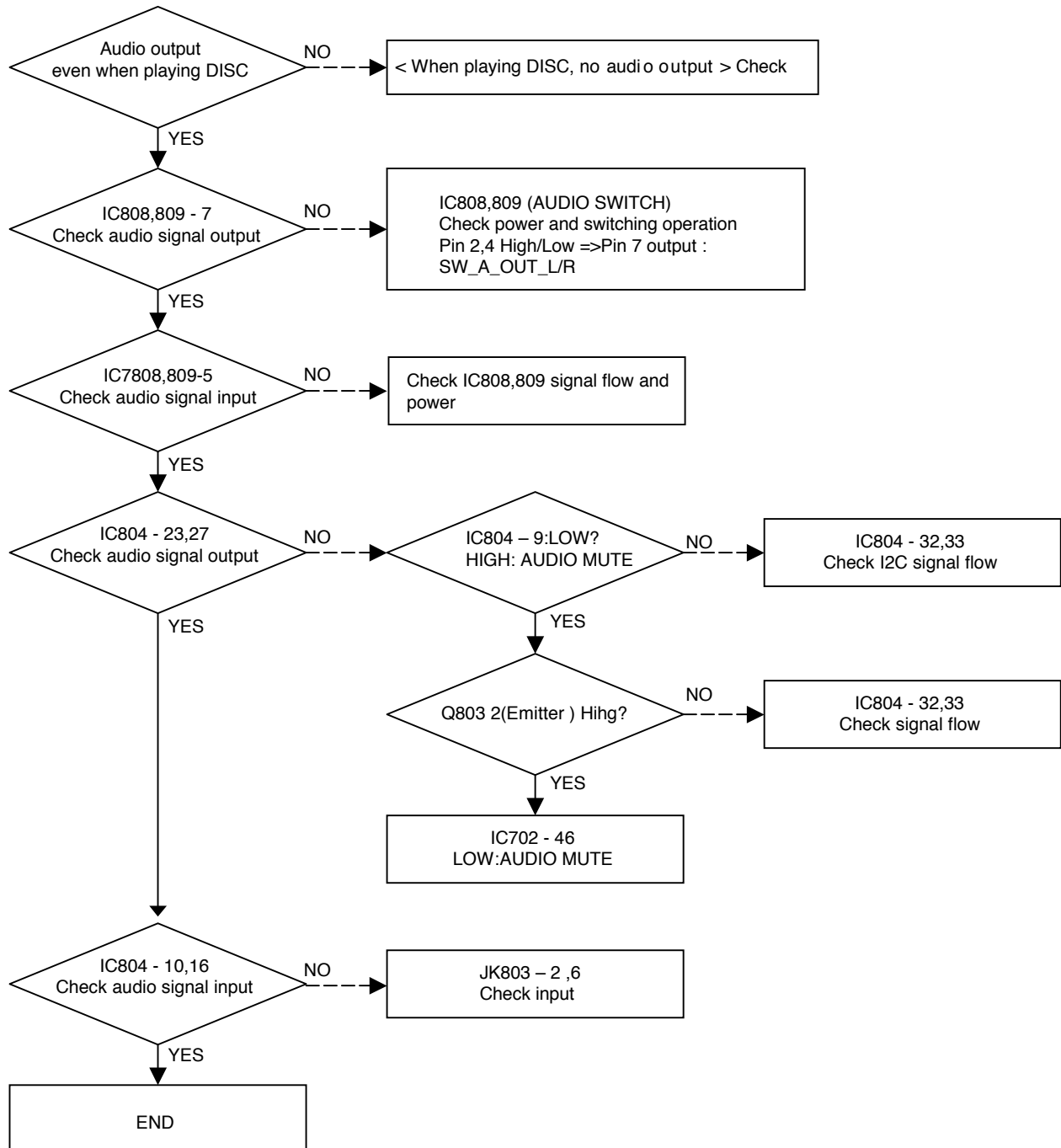


No TUNER audio output

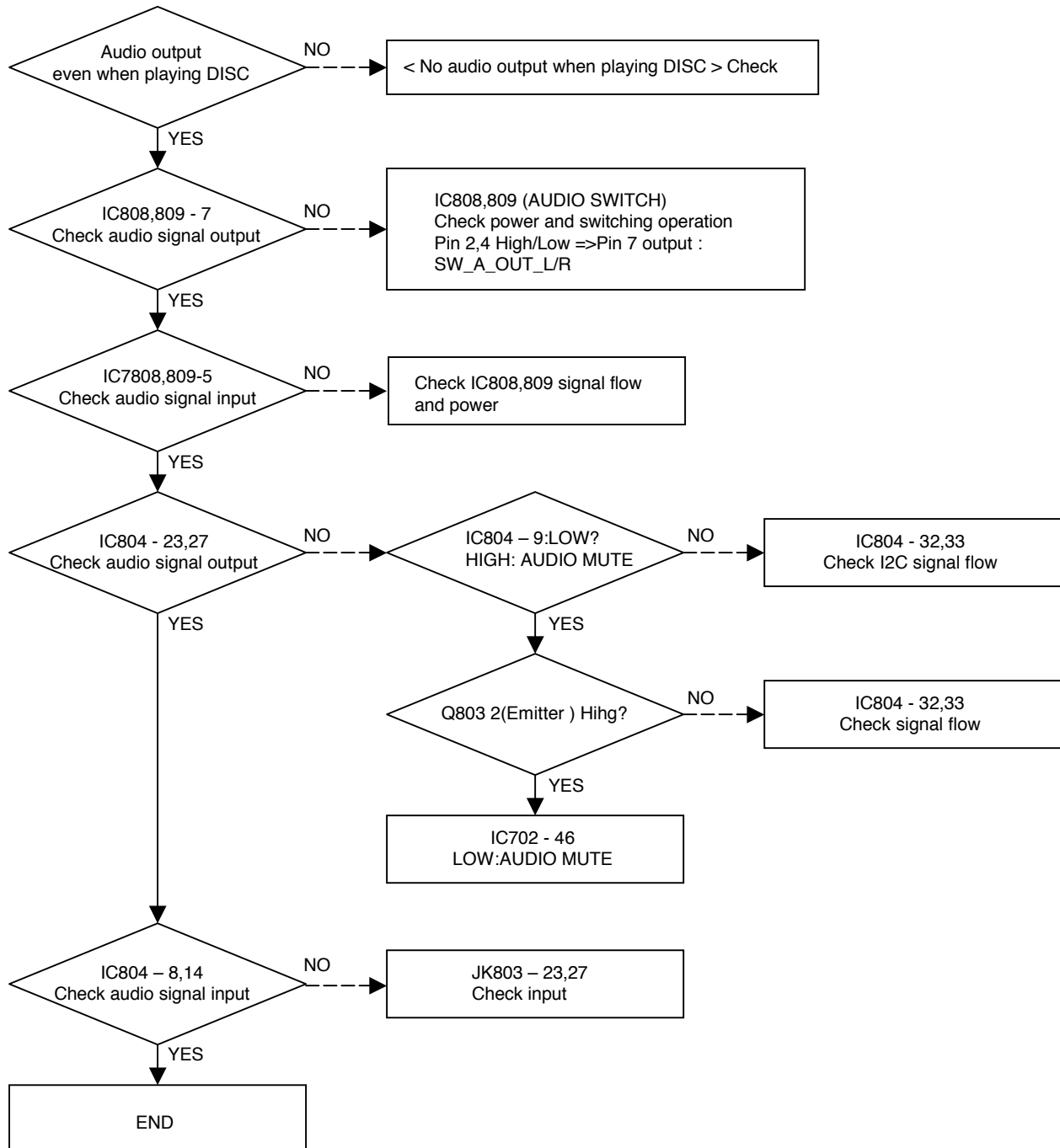




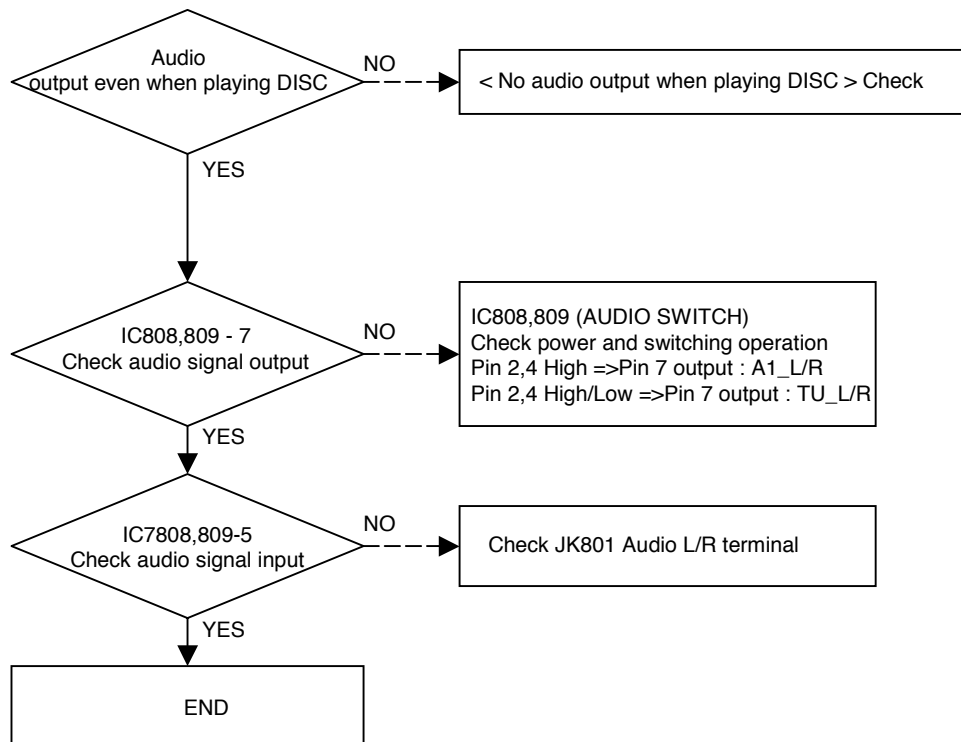
No external input 1 audio



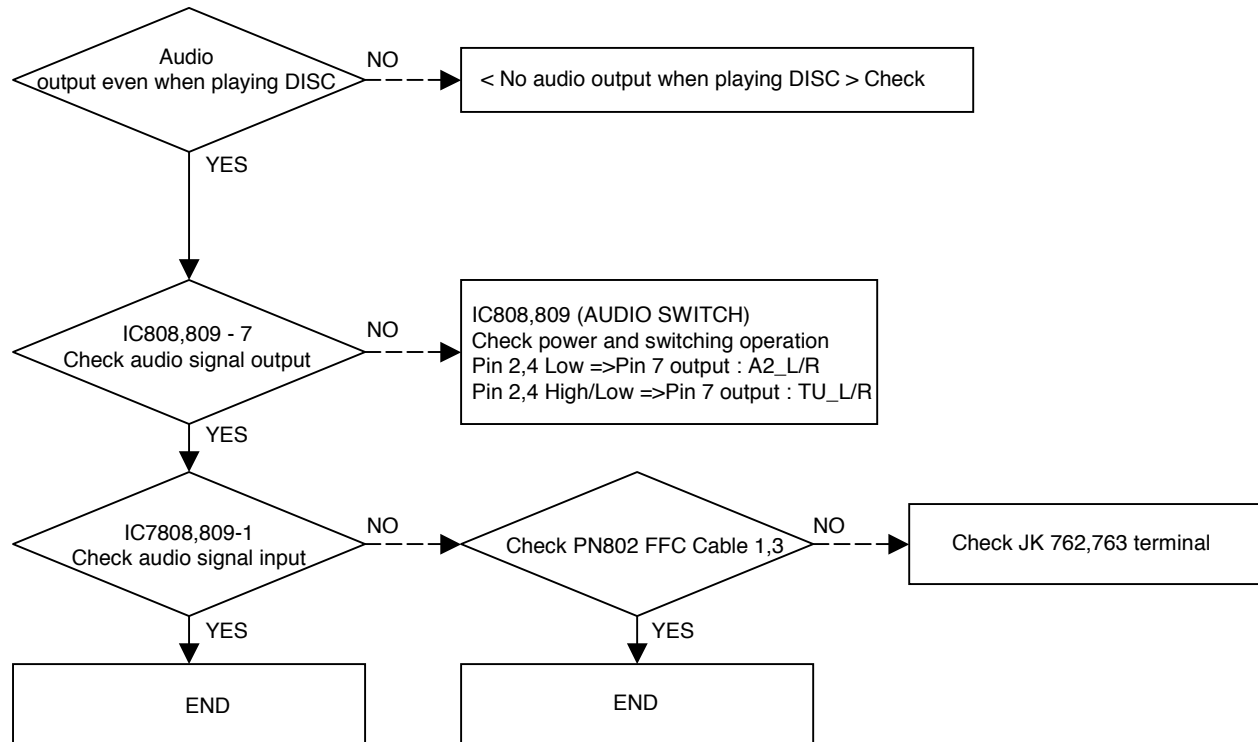
No external input 2 audio

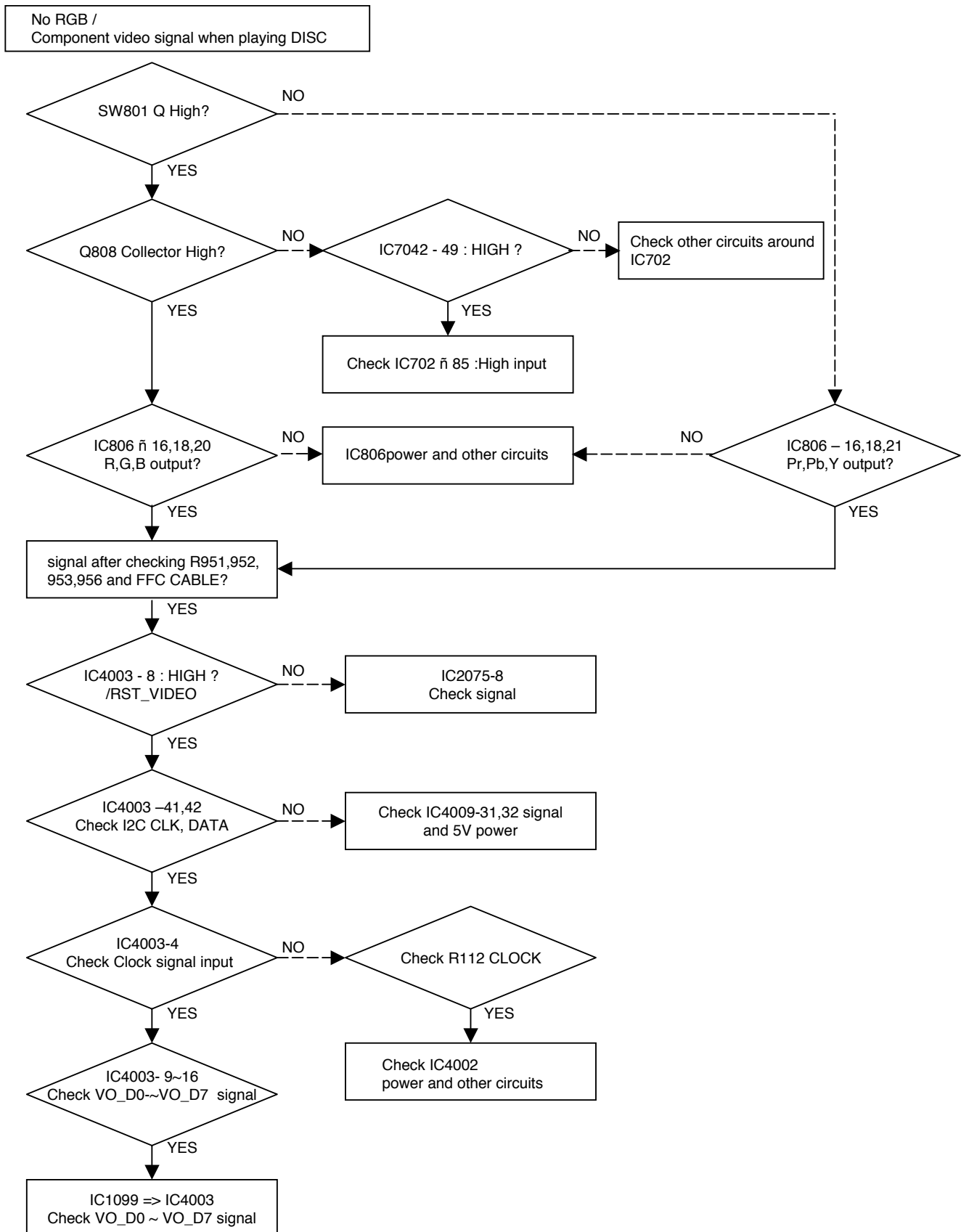


No external input 3 audio

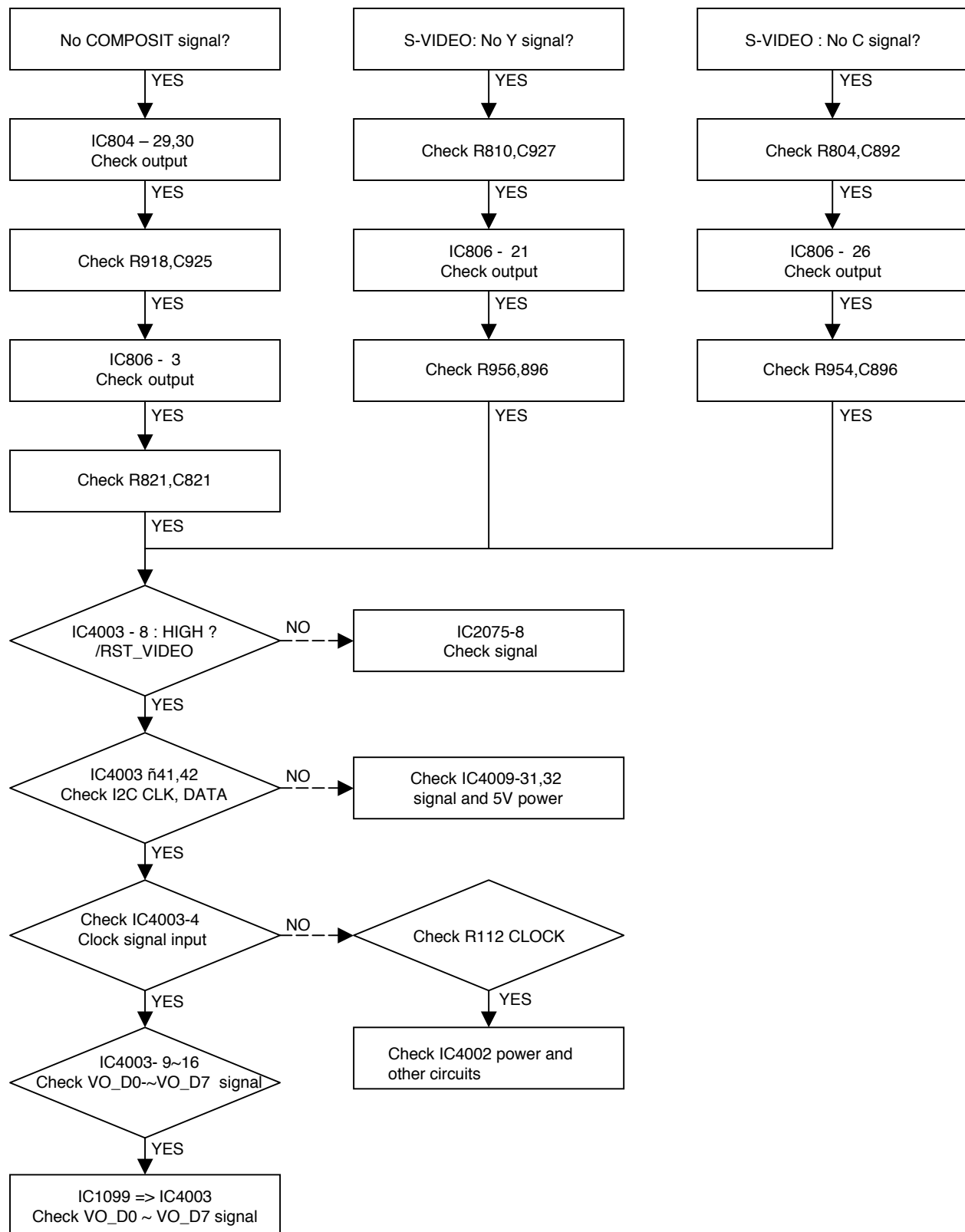


No external input 4 audio

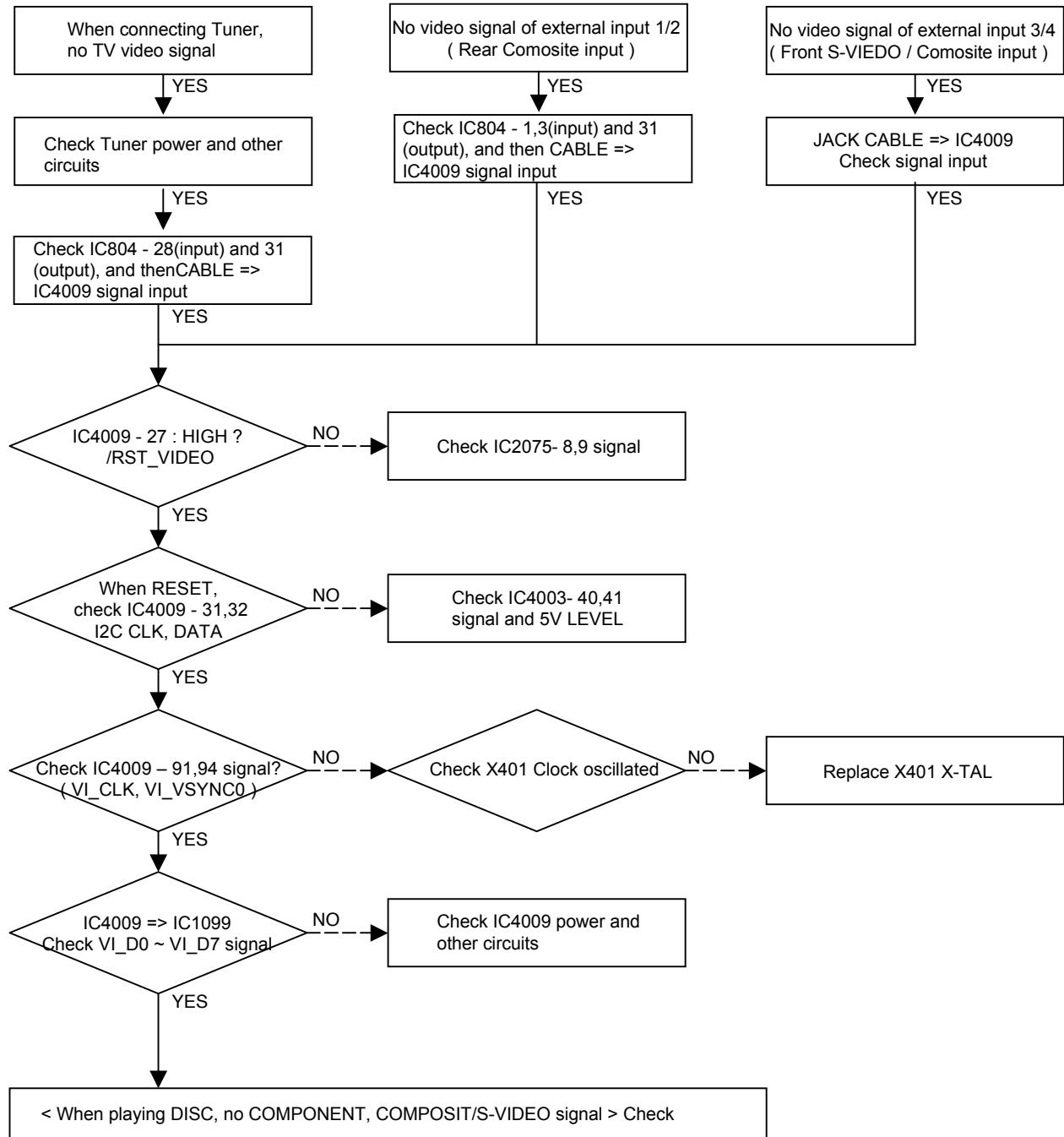




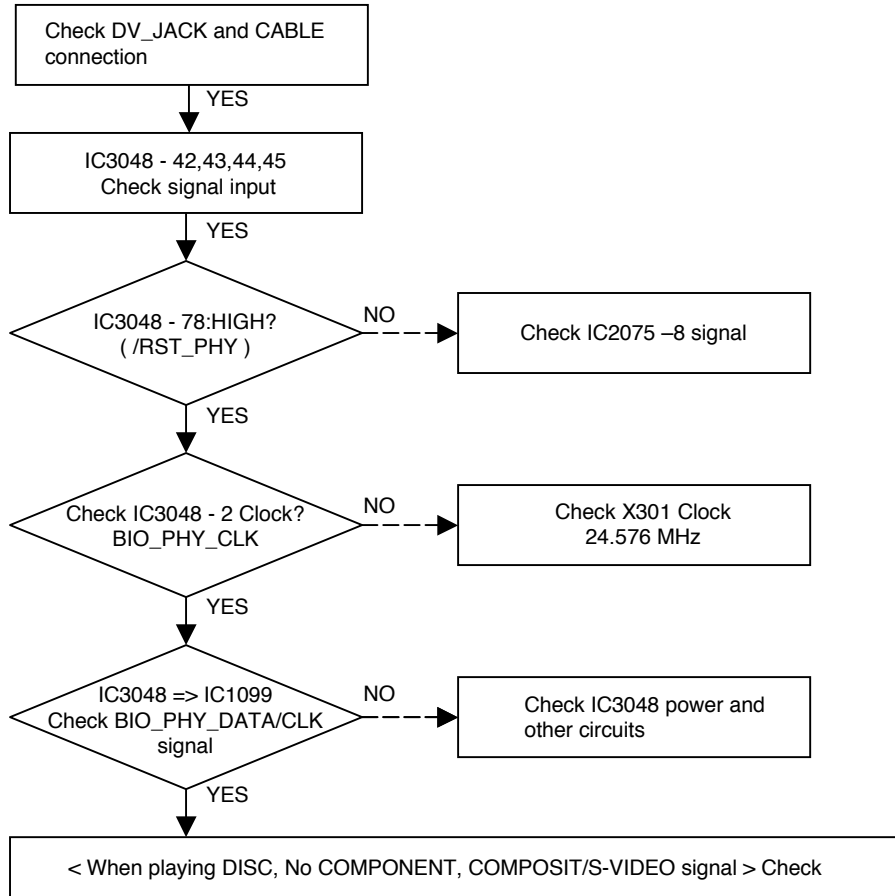
No COMPOSIT / S-VIDEO signal when playing DISC



No TV , external input video signal

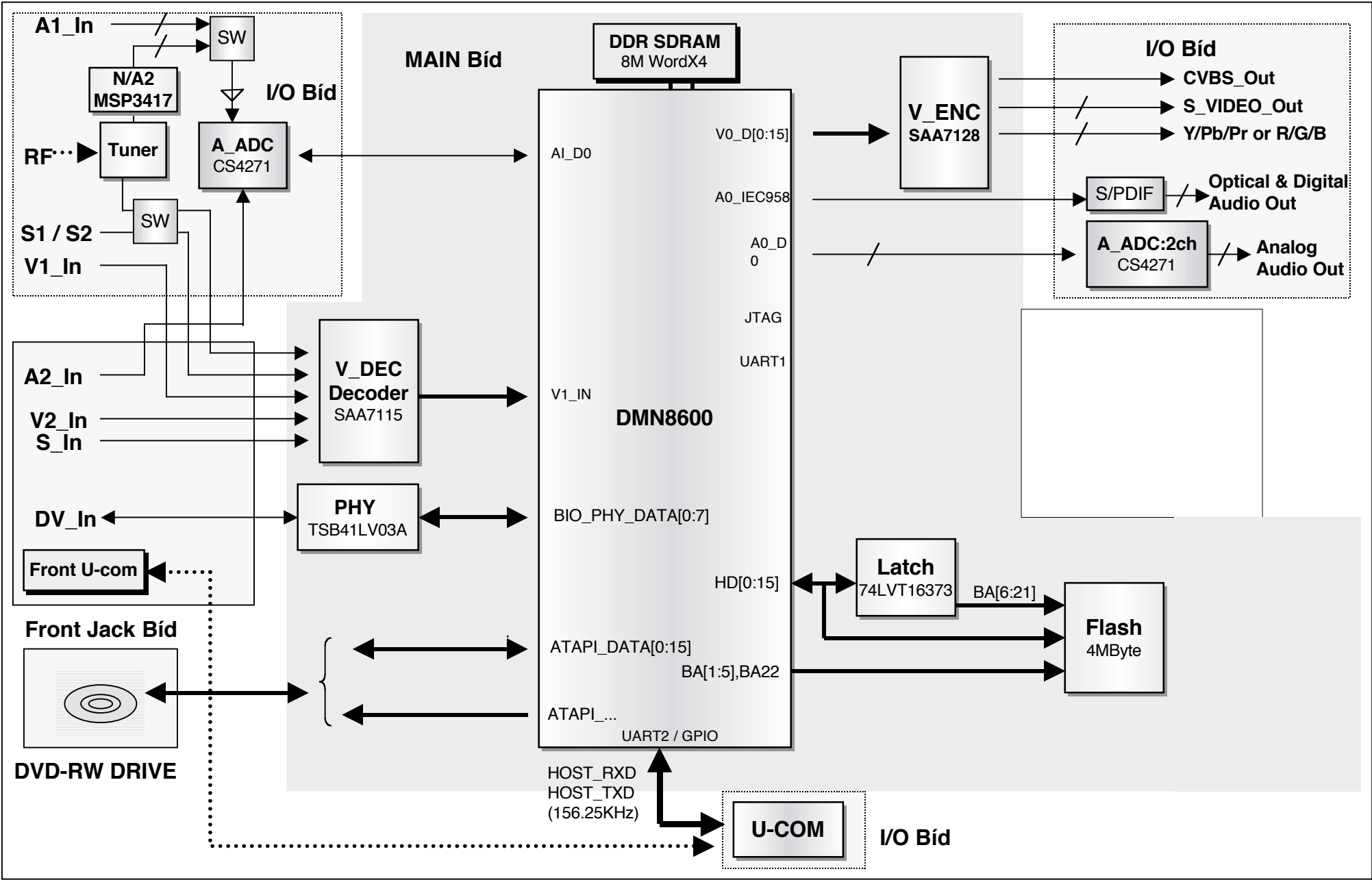


No DV(IEEE 1394) input (video/audio) signal

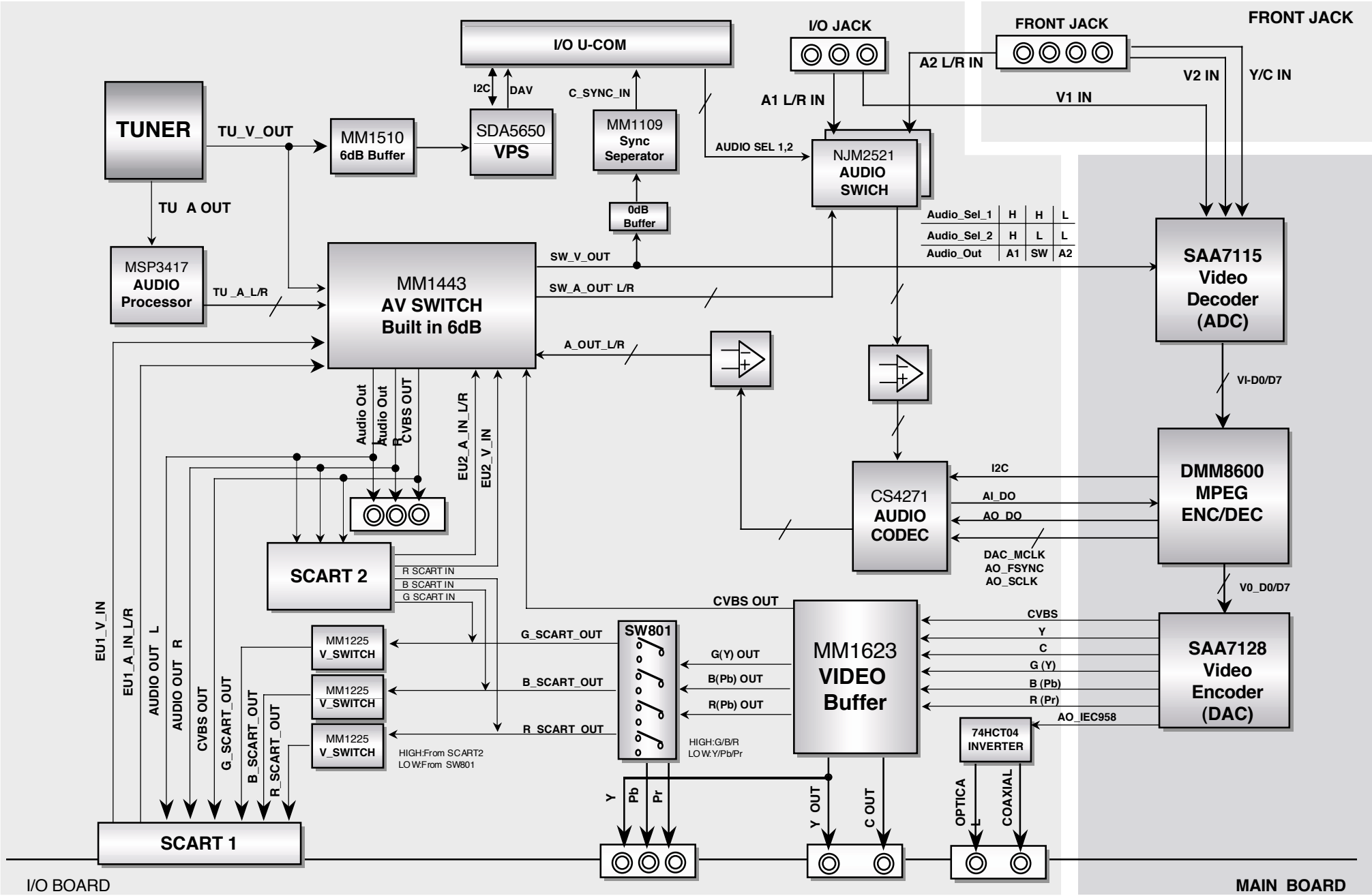


BLOCK DIAGRAMS

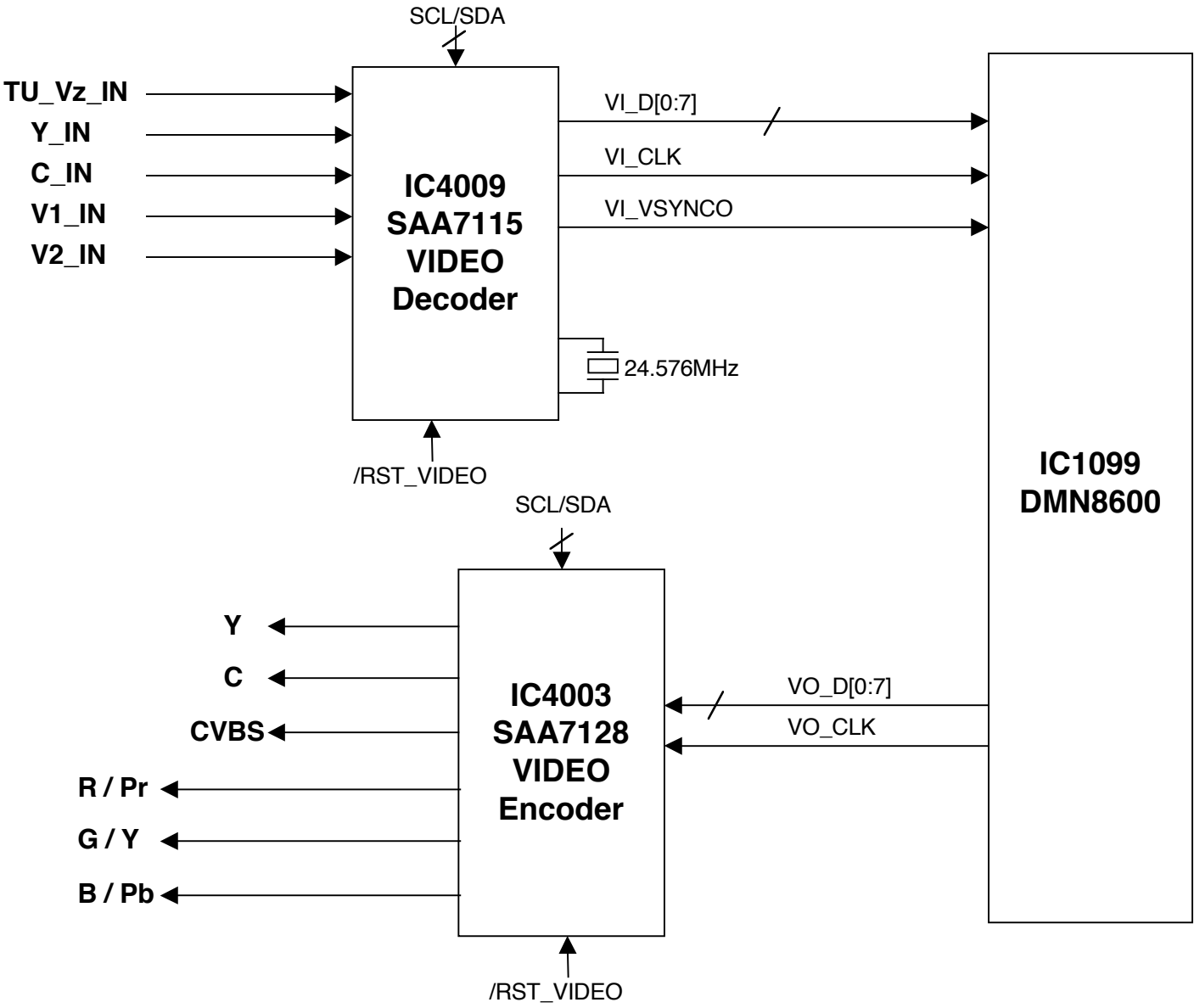
1. LSI Overall Block Diagram



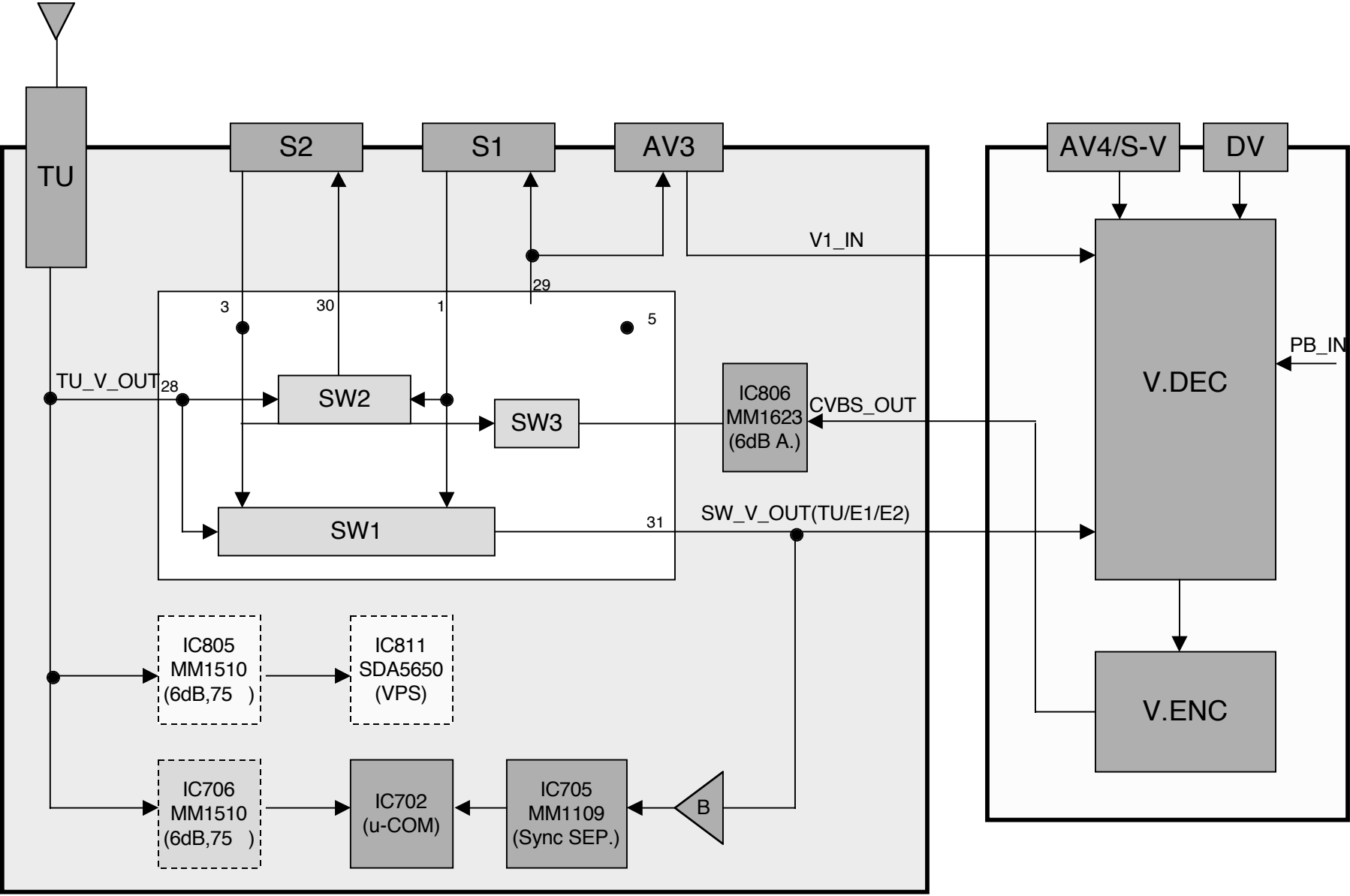
2. In/Out Block Diagram



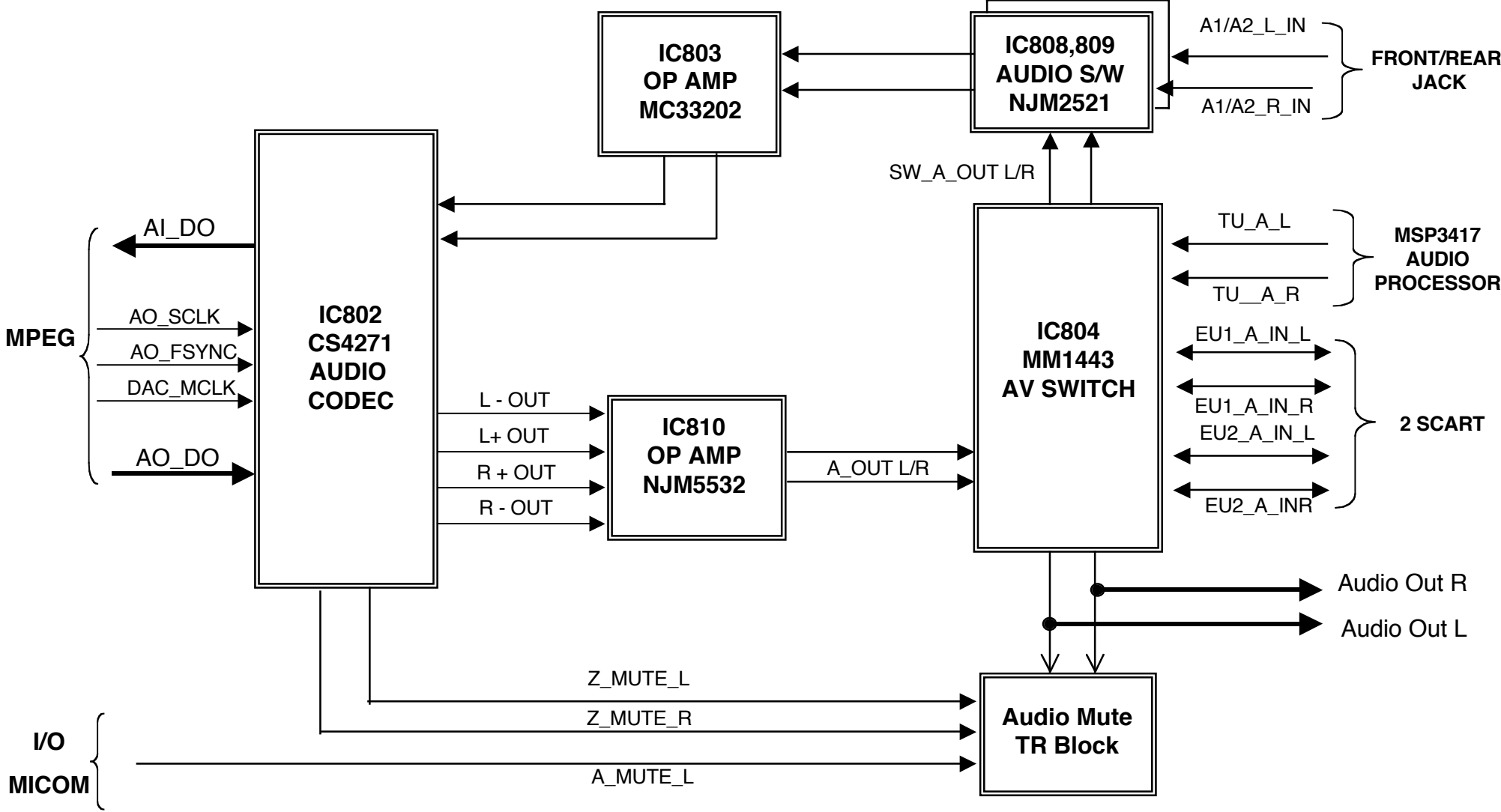
3. Video In/Out Block Diagram



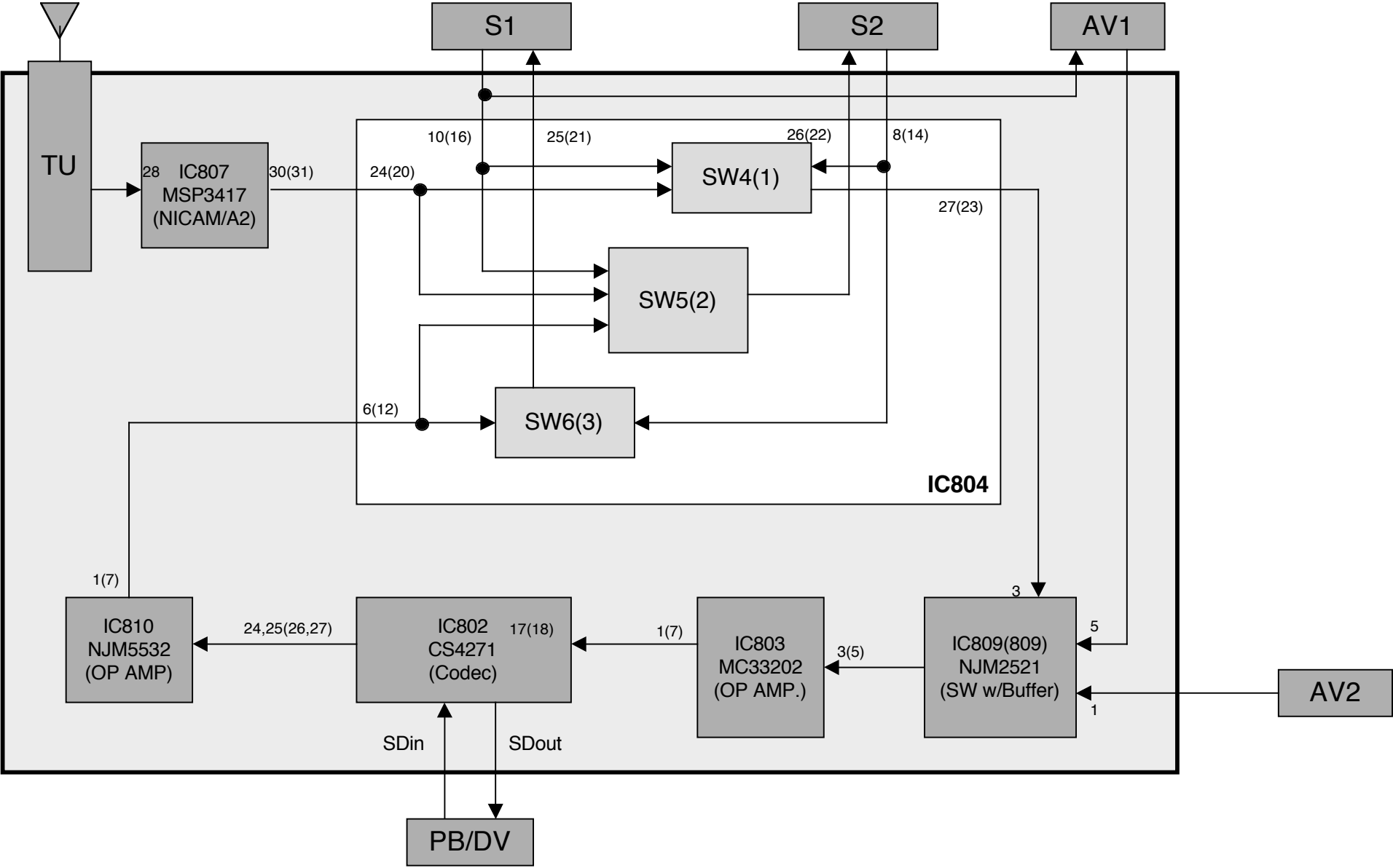
4. Video SW Path Block Diagram



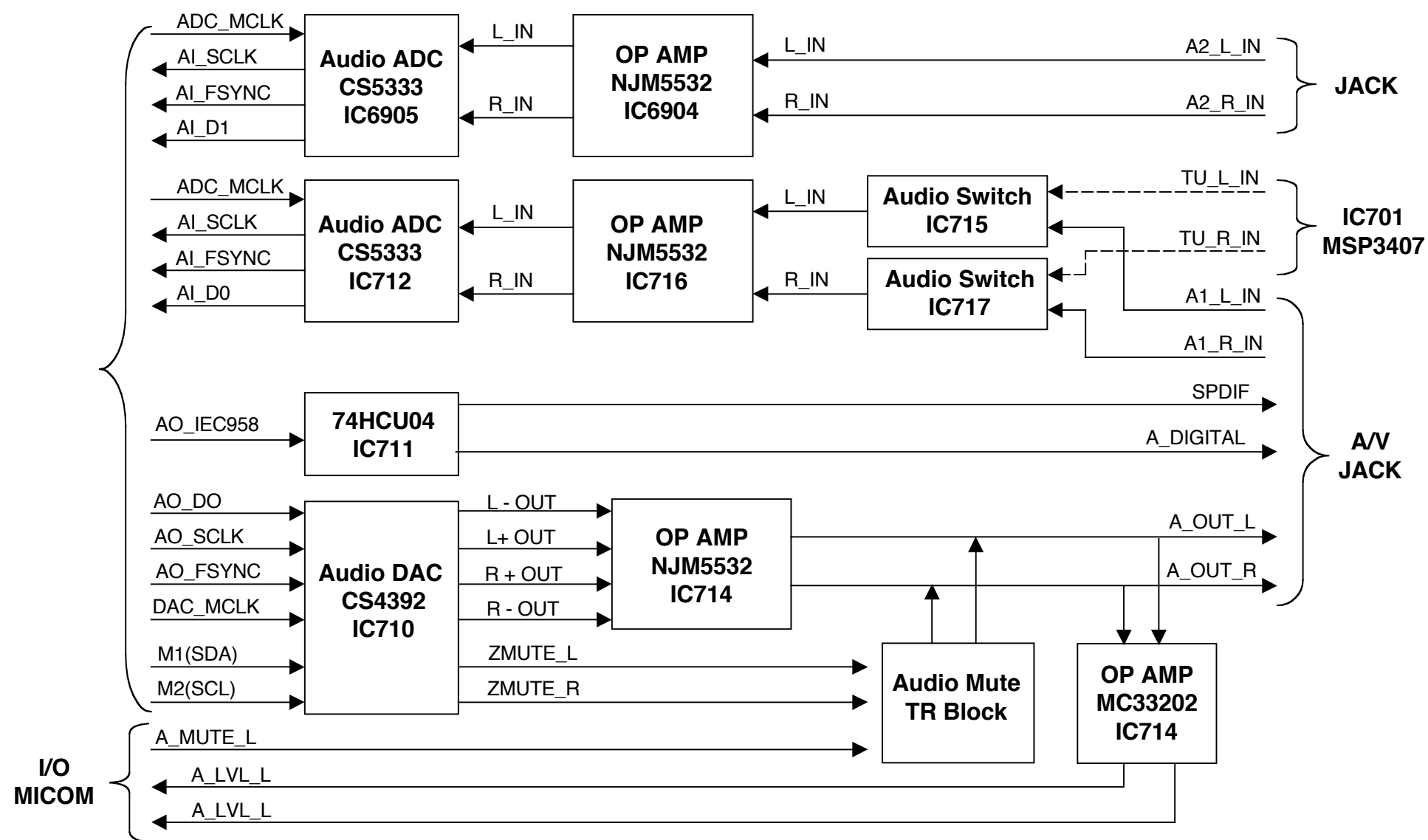
5. Audio Block Diagram



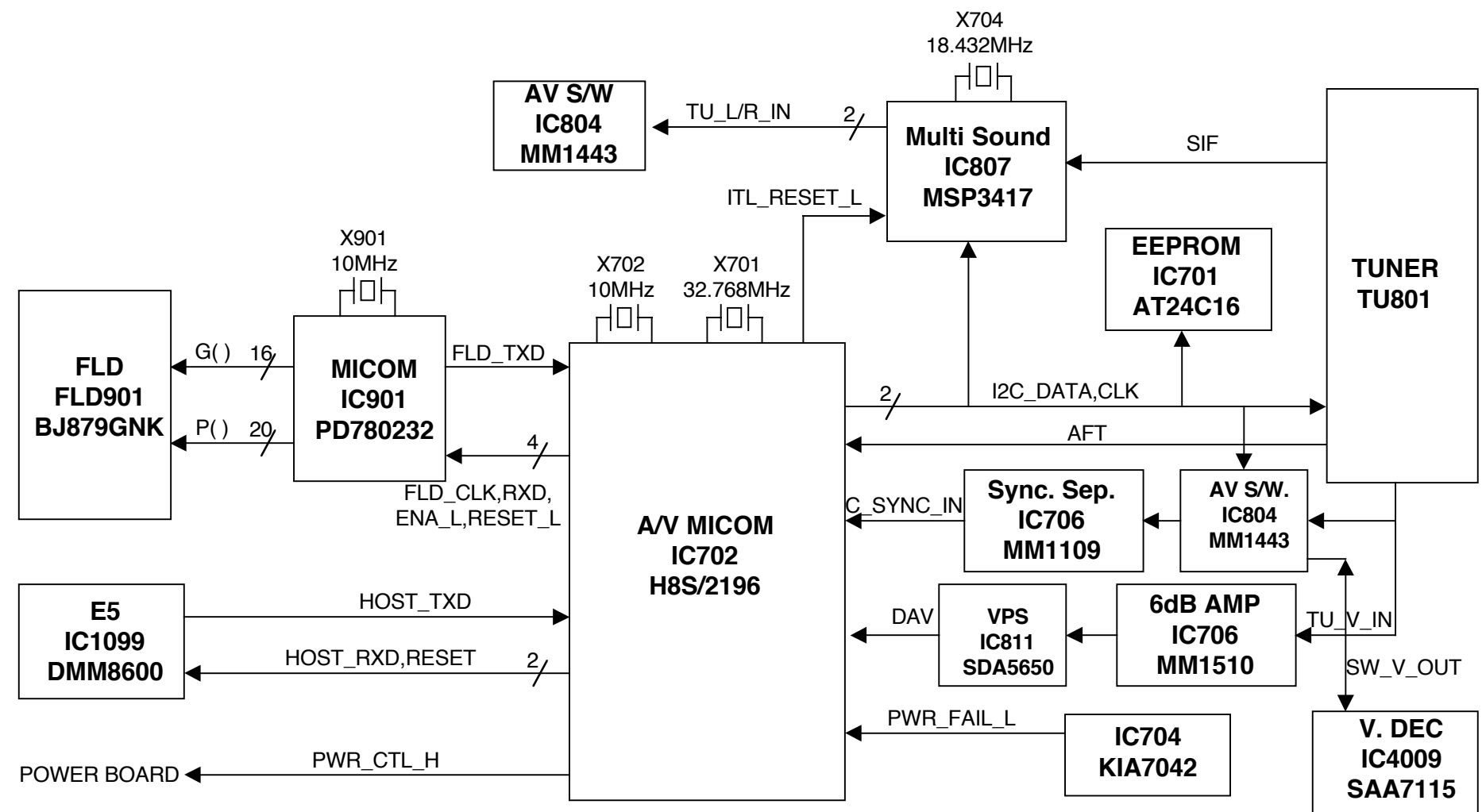
6. Audio SW Path Block Diagram



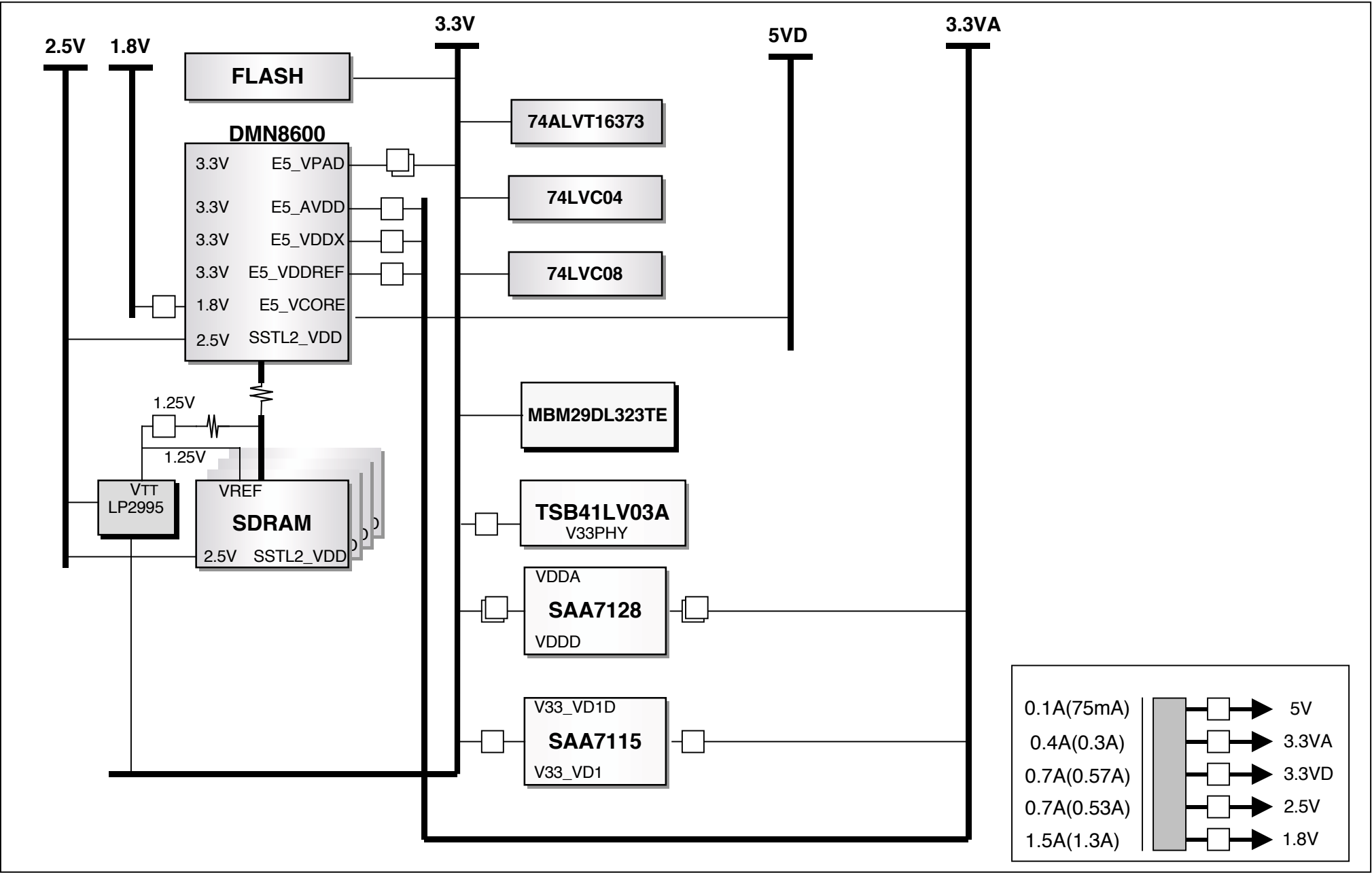
7. Audio In/Out Block Diagram



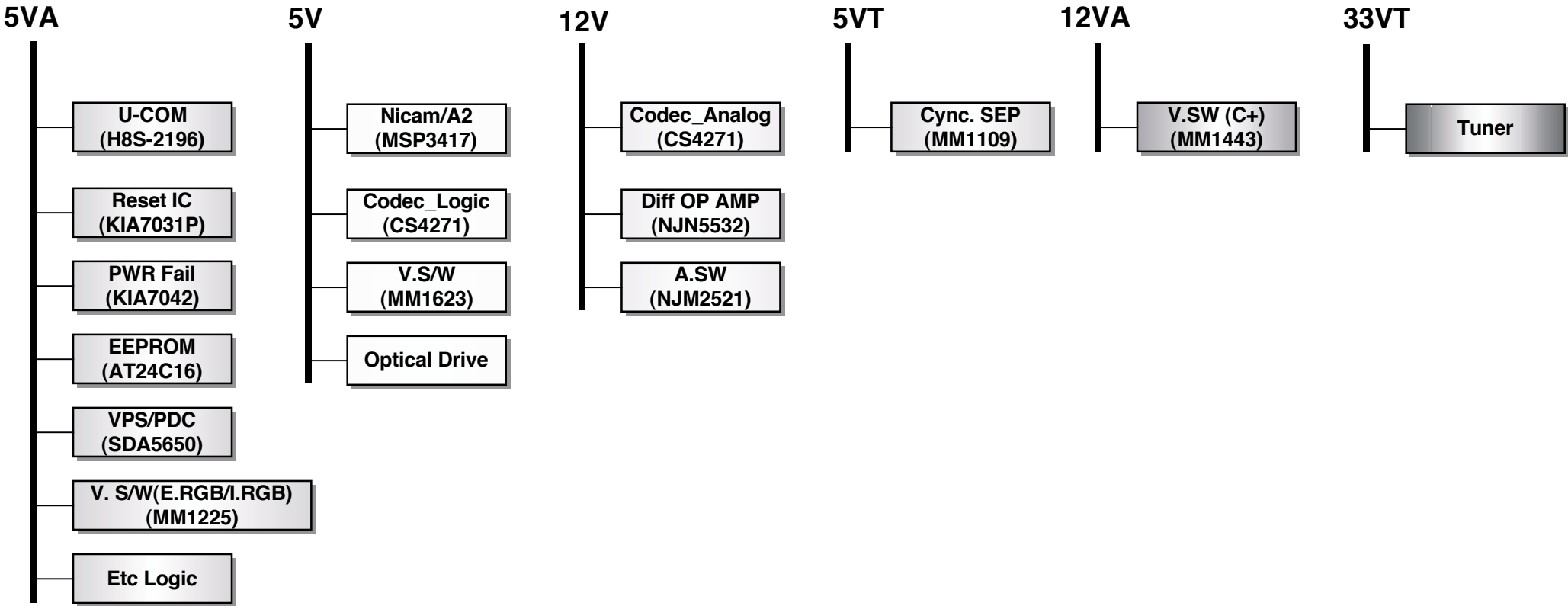
8. FLD/ μ -COM/Tuner Block Diagram



9. Power : Main Board Block Diagram

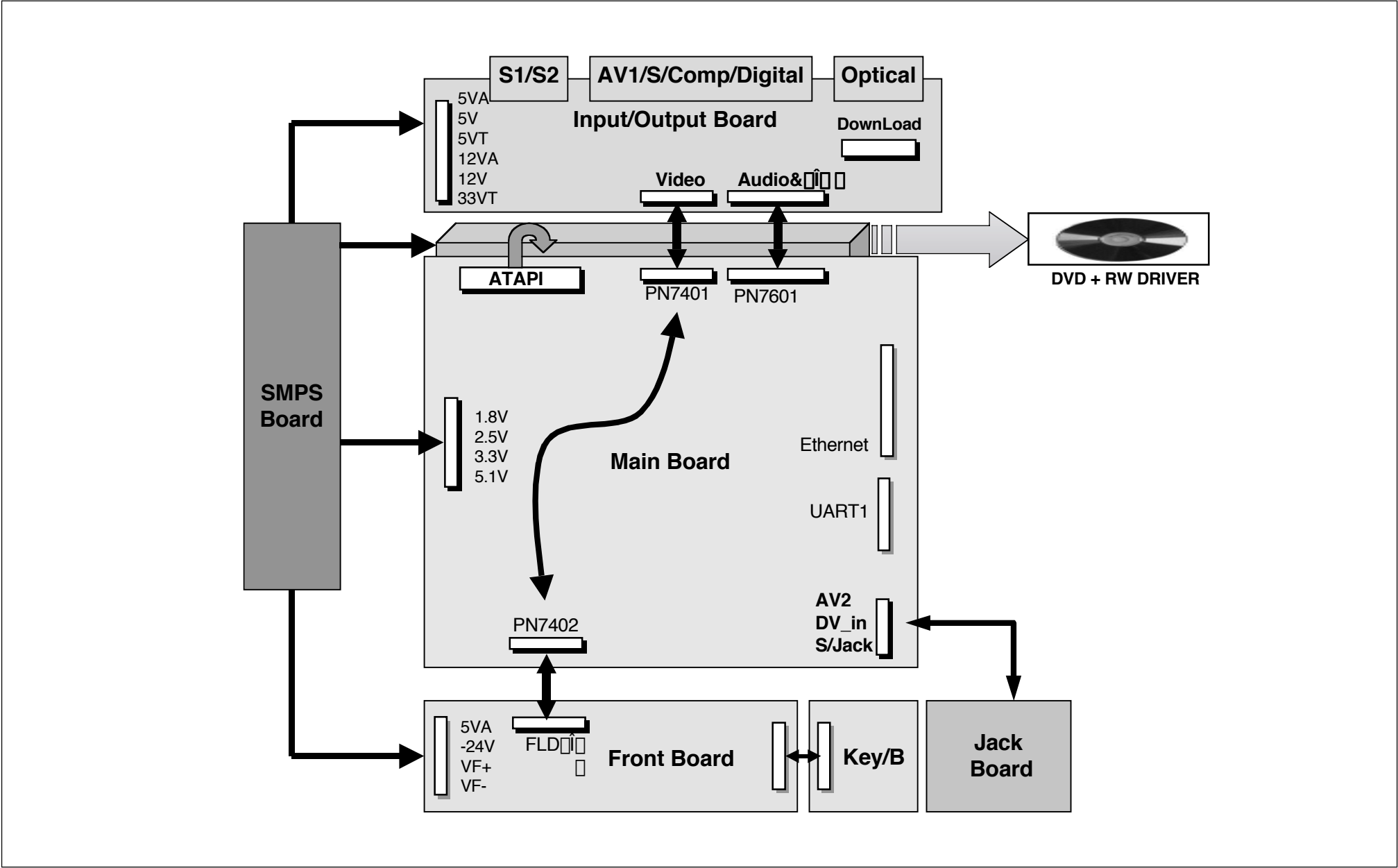


10. Power : I/O Board Block Diagram

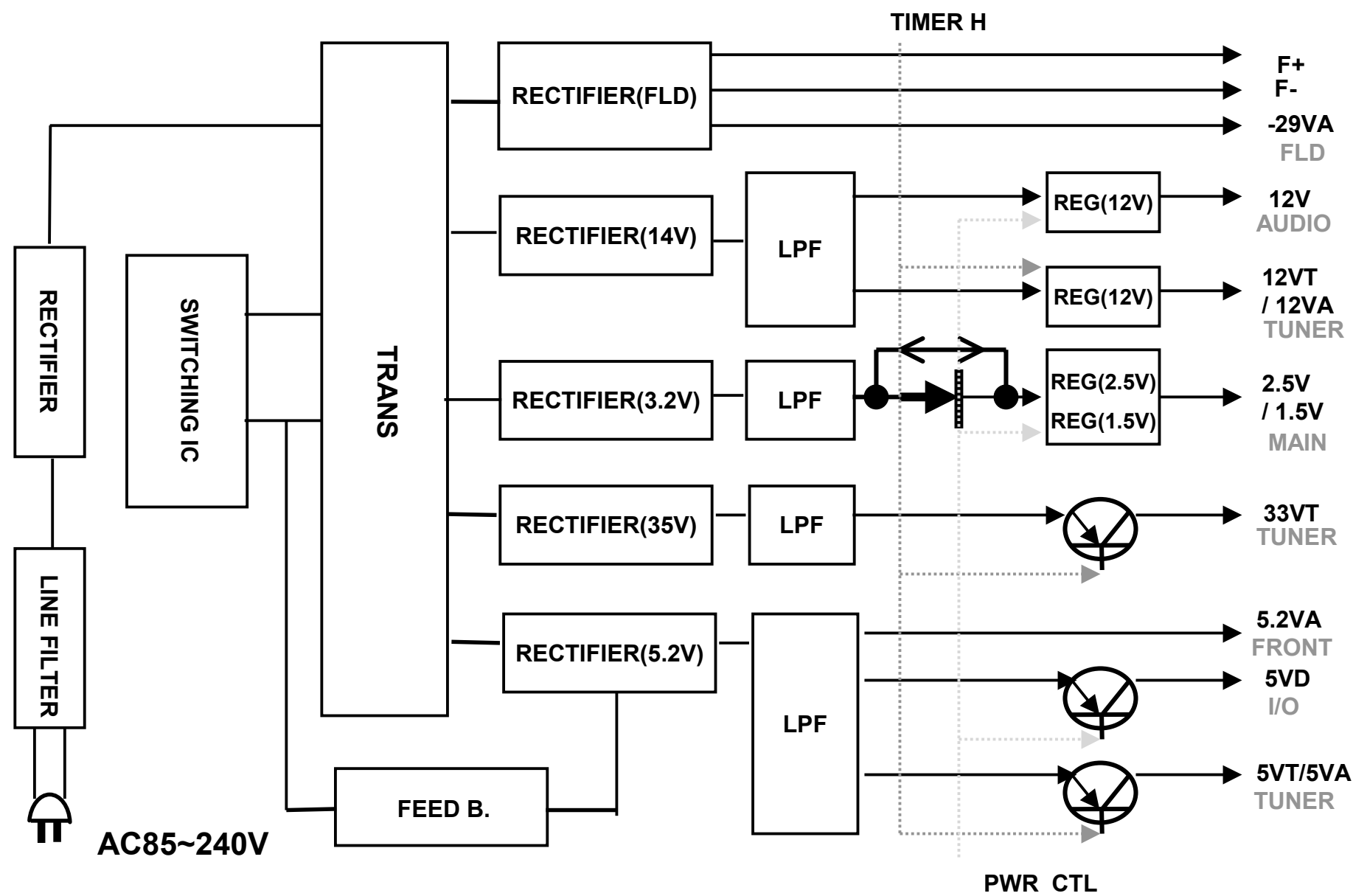


I/O Ucom PWR CTL SIGNAL	
PWR_CTL_H	5V, 12V CONTROL
TIMER_H	5VT, 33VT

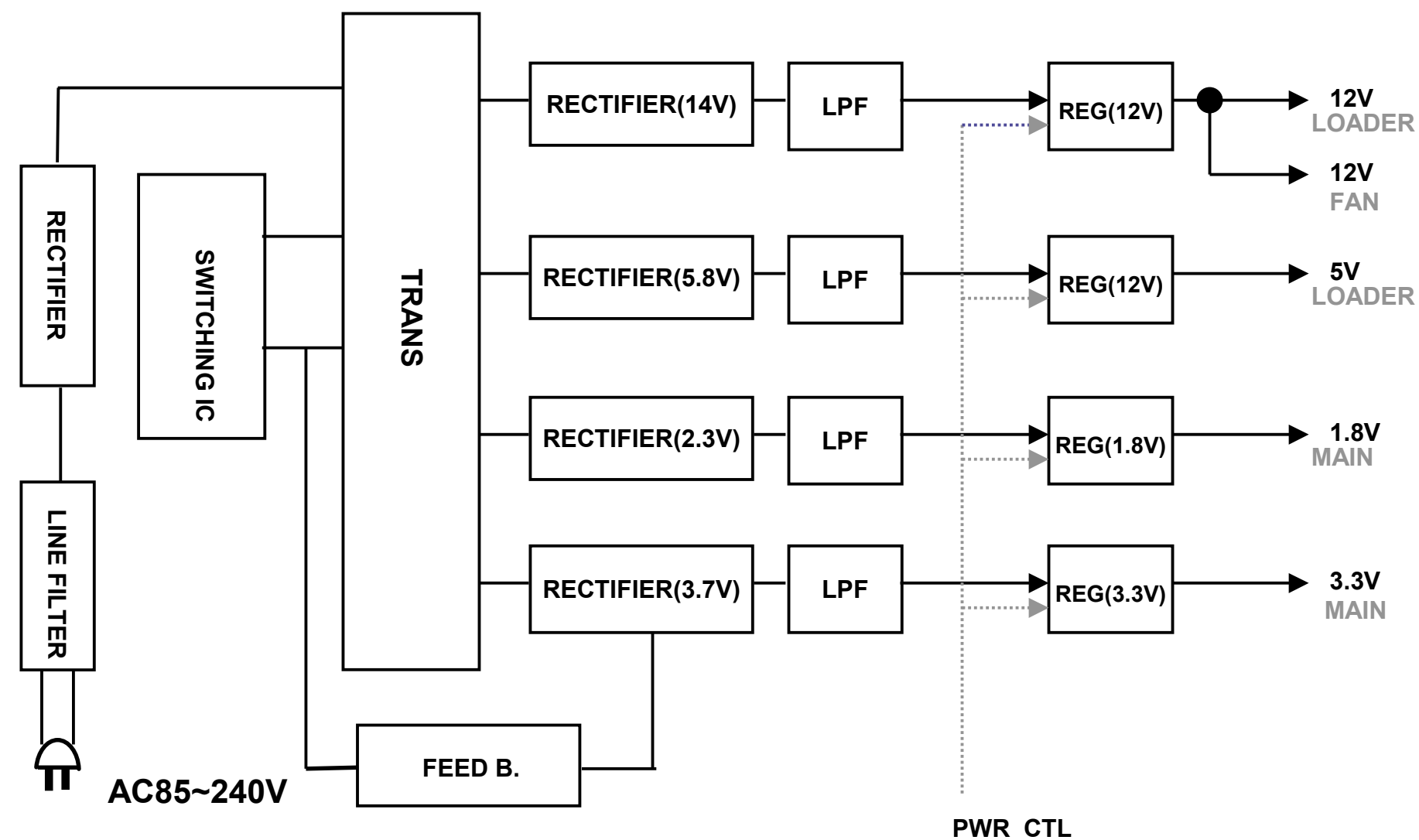
11. Power : Layout Connection Block Diagram



12. SMPS Block Diagram (PART 1)

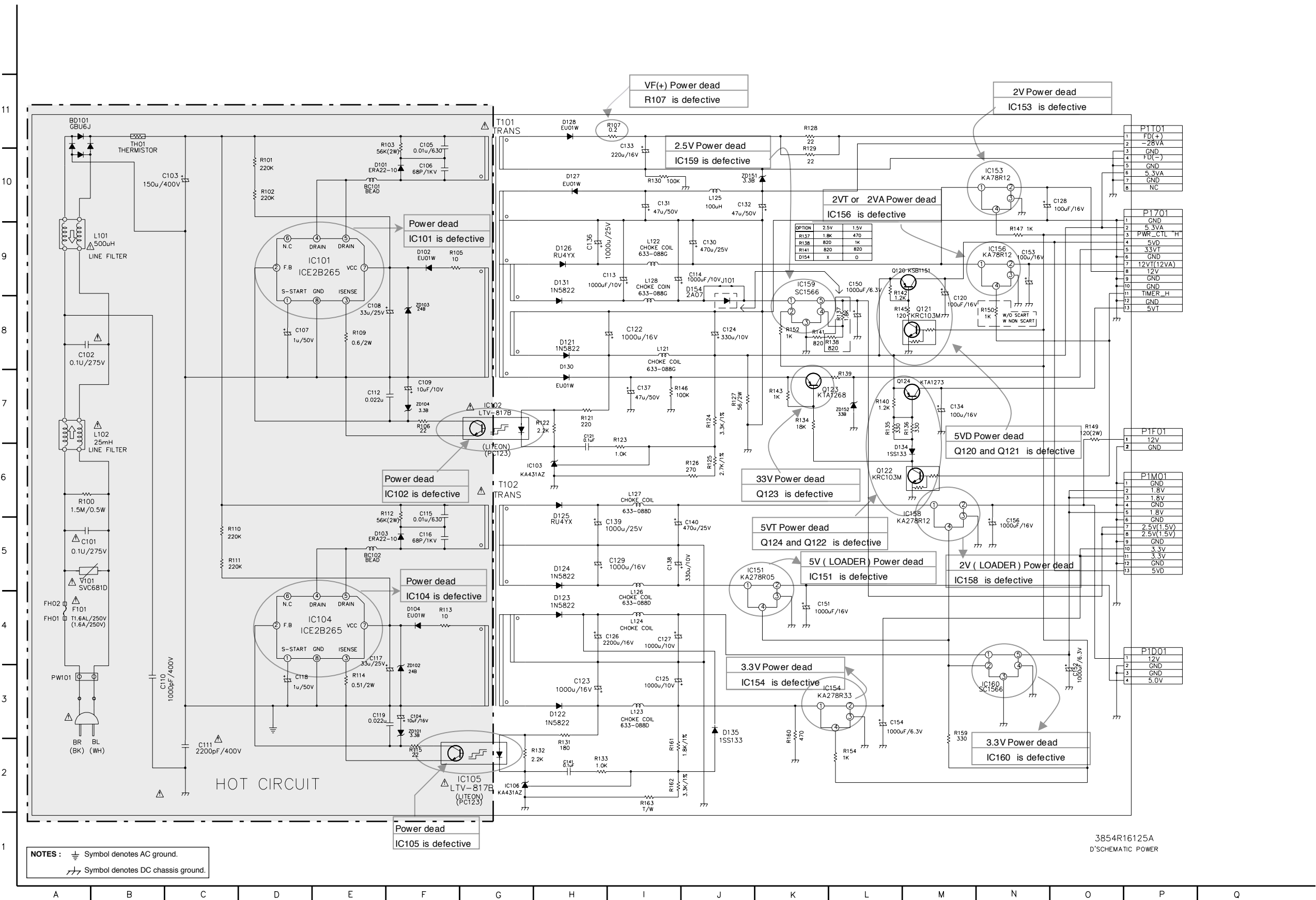


13. SMPS Block Diagram (PART 2)

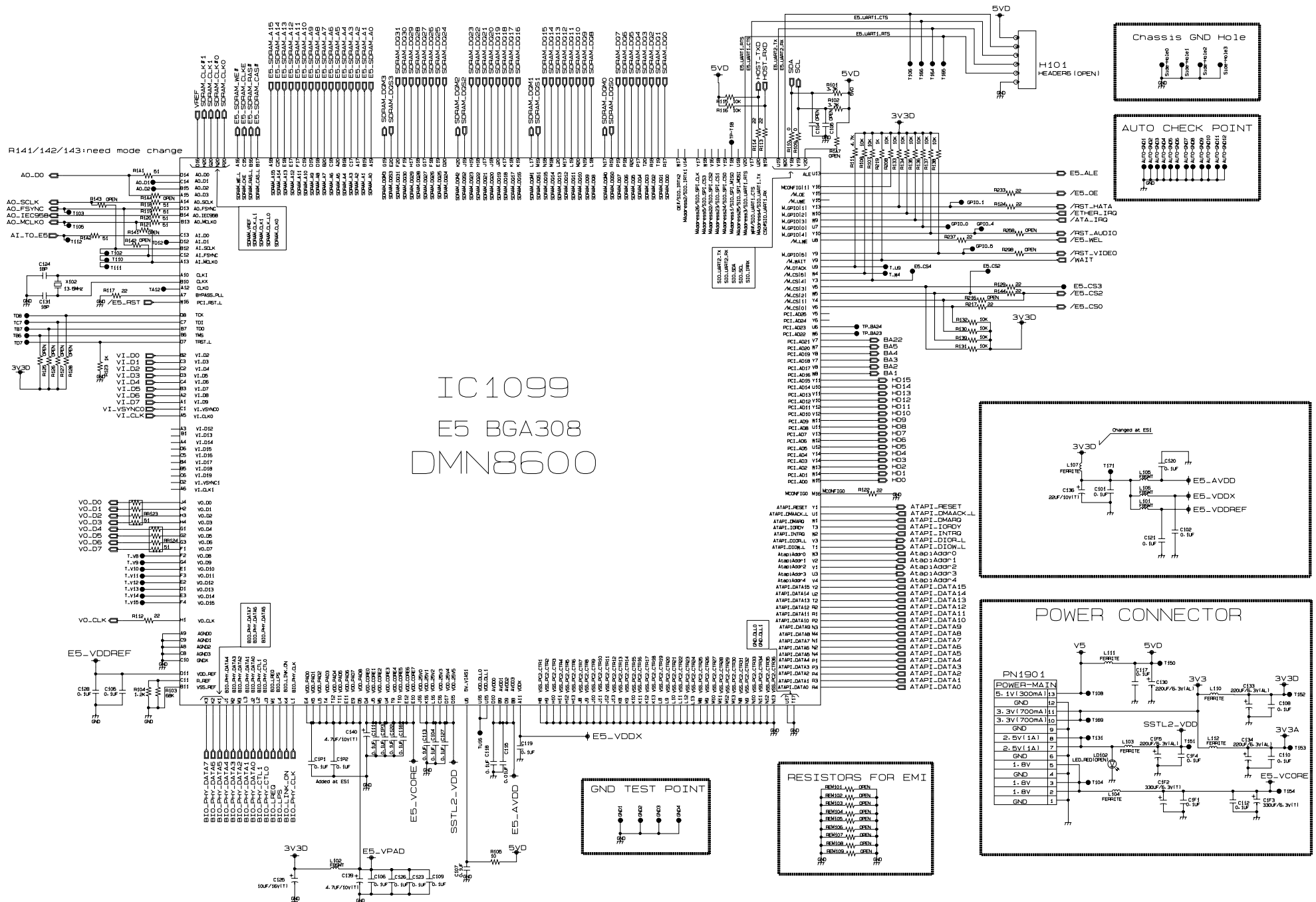


CIRCUIT DIAGRAMS

1. POWER CIRCUIT DIAGRAM

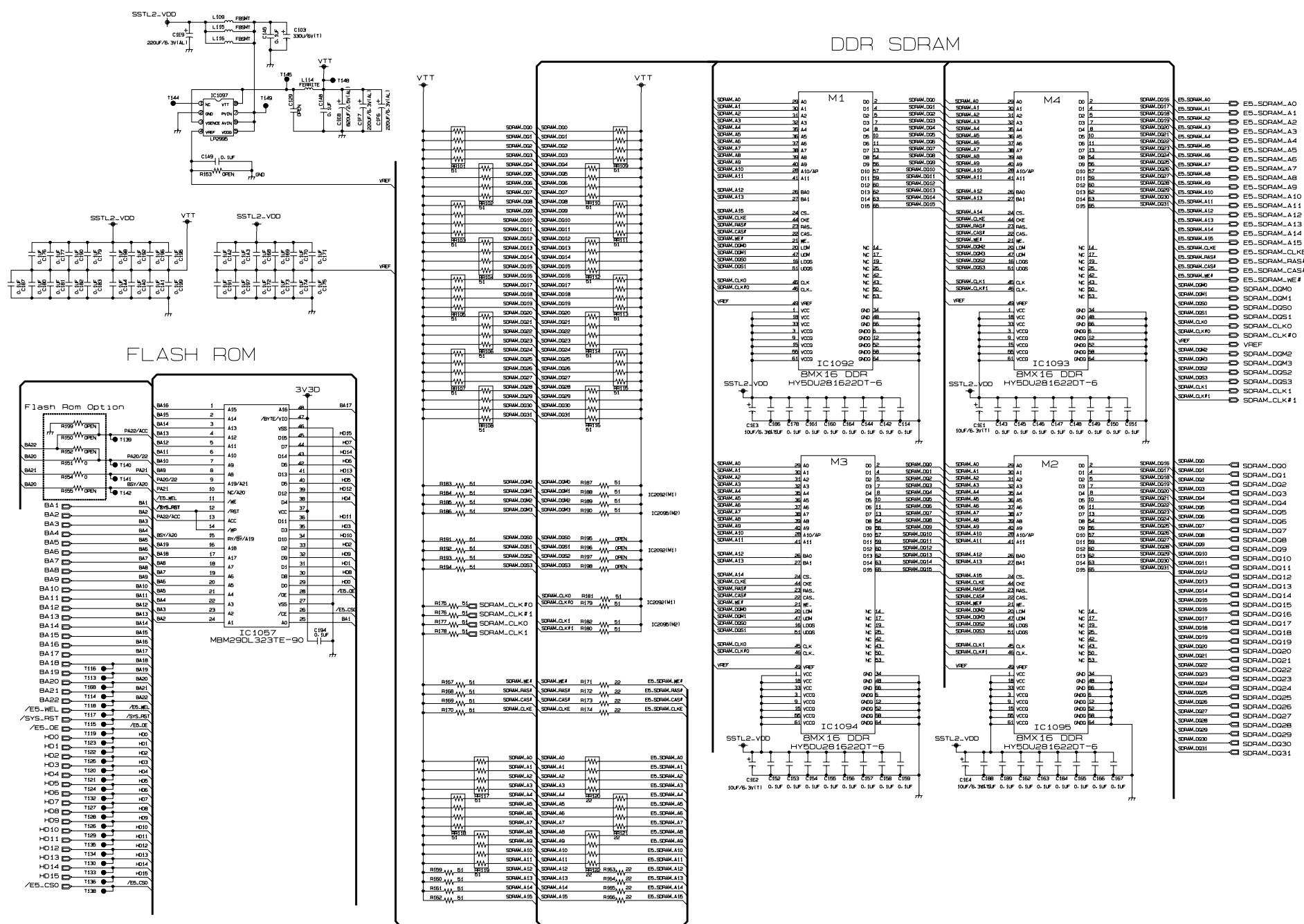


2. E5 BGA, POWER, UART2 CIRCUIT DIAGRAM



SR17201B

3. DDR SDRAM, FLASH CIRCUIT DIAGRAM



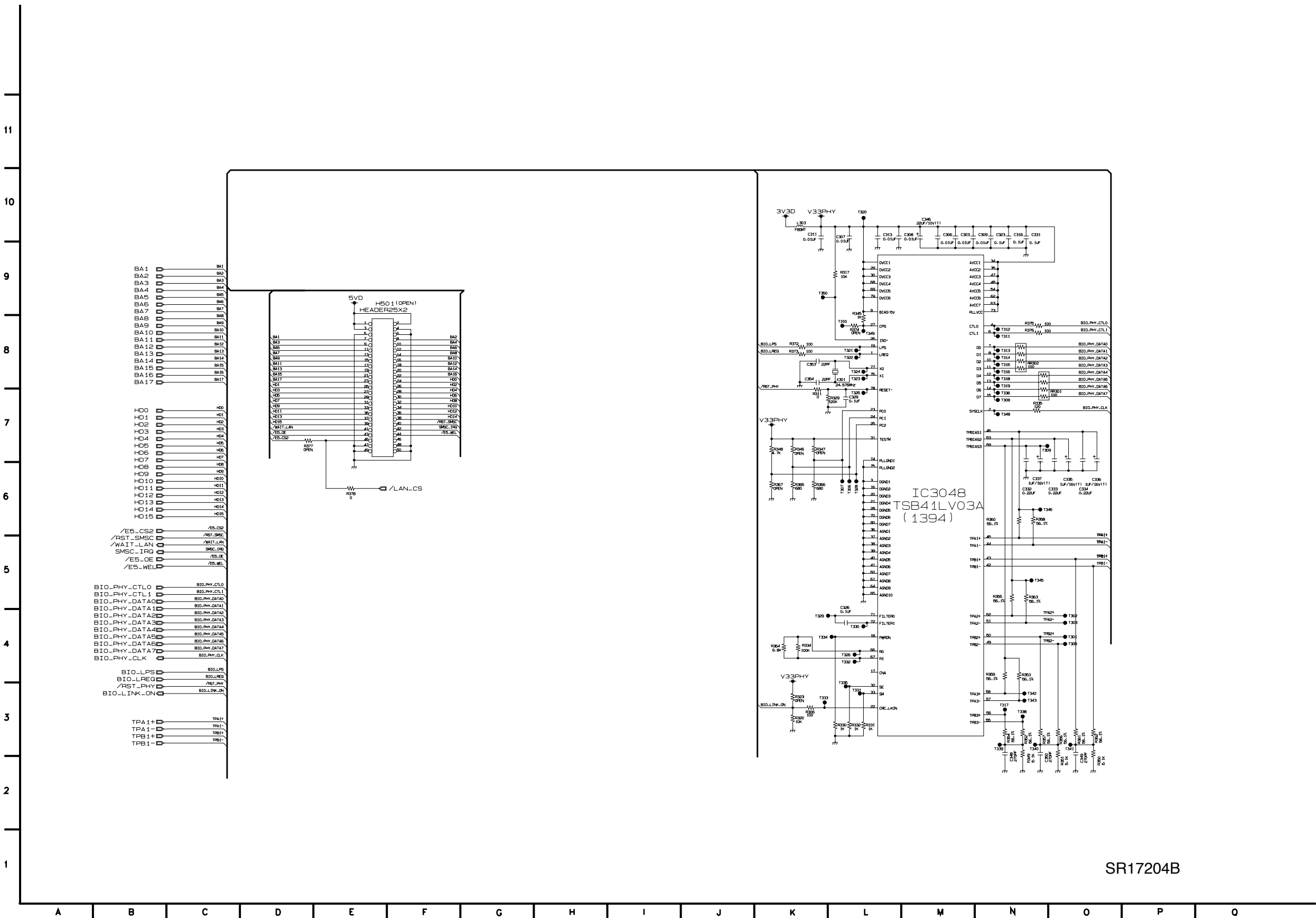
SR17202B

A vertical number line with tick marks labeled 1 through 11. The line is oriented vertically, with 1 at the bottom and 11 at the top. Each tick mark is labeled with its corresponding integer value.



1

5. 1394, ETHERNET CONNECTOR CIRCUIT DIAGRAM



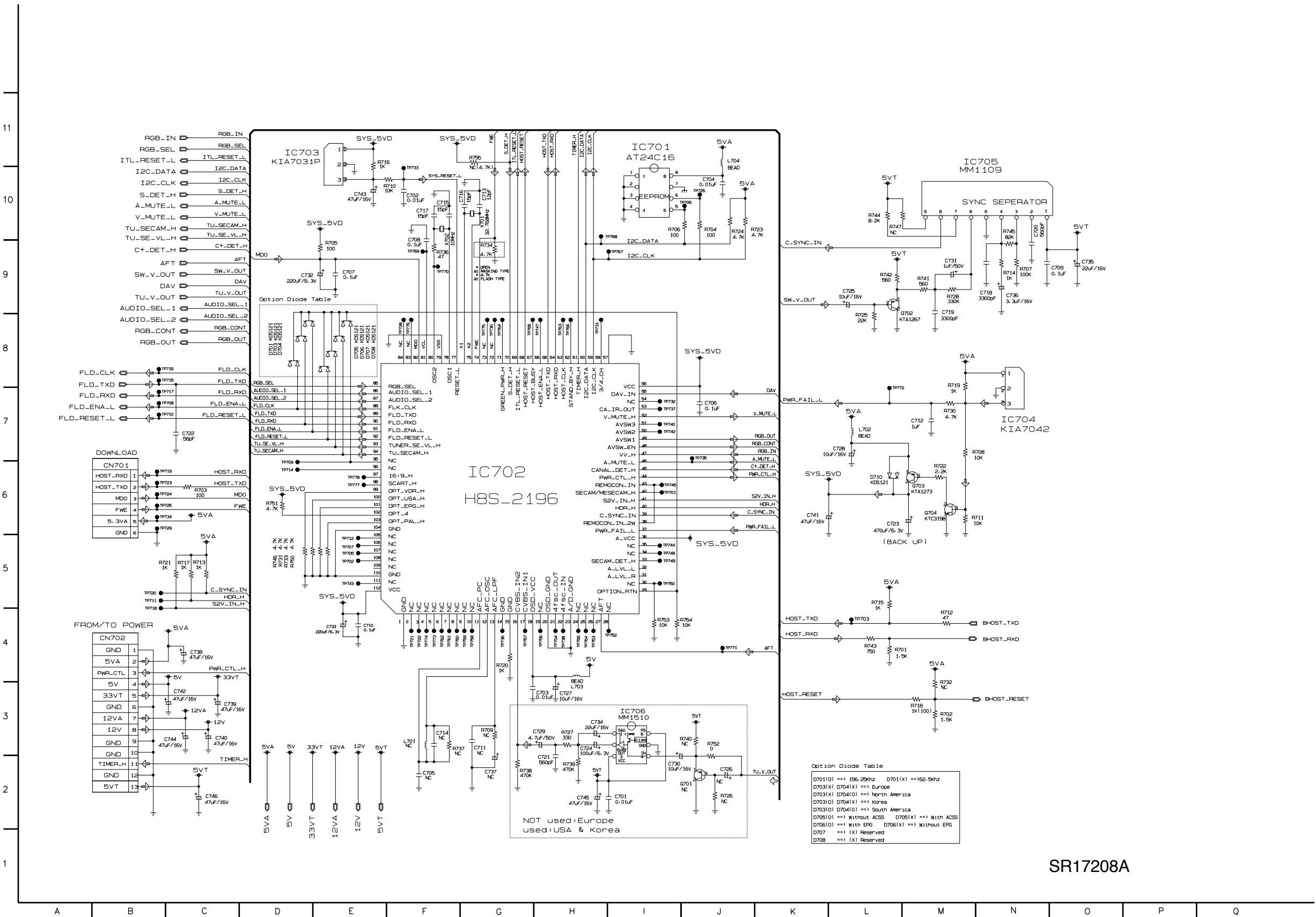
SR17204B

11
10
9
8
7
6
5
4
3
2
1



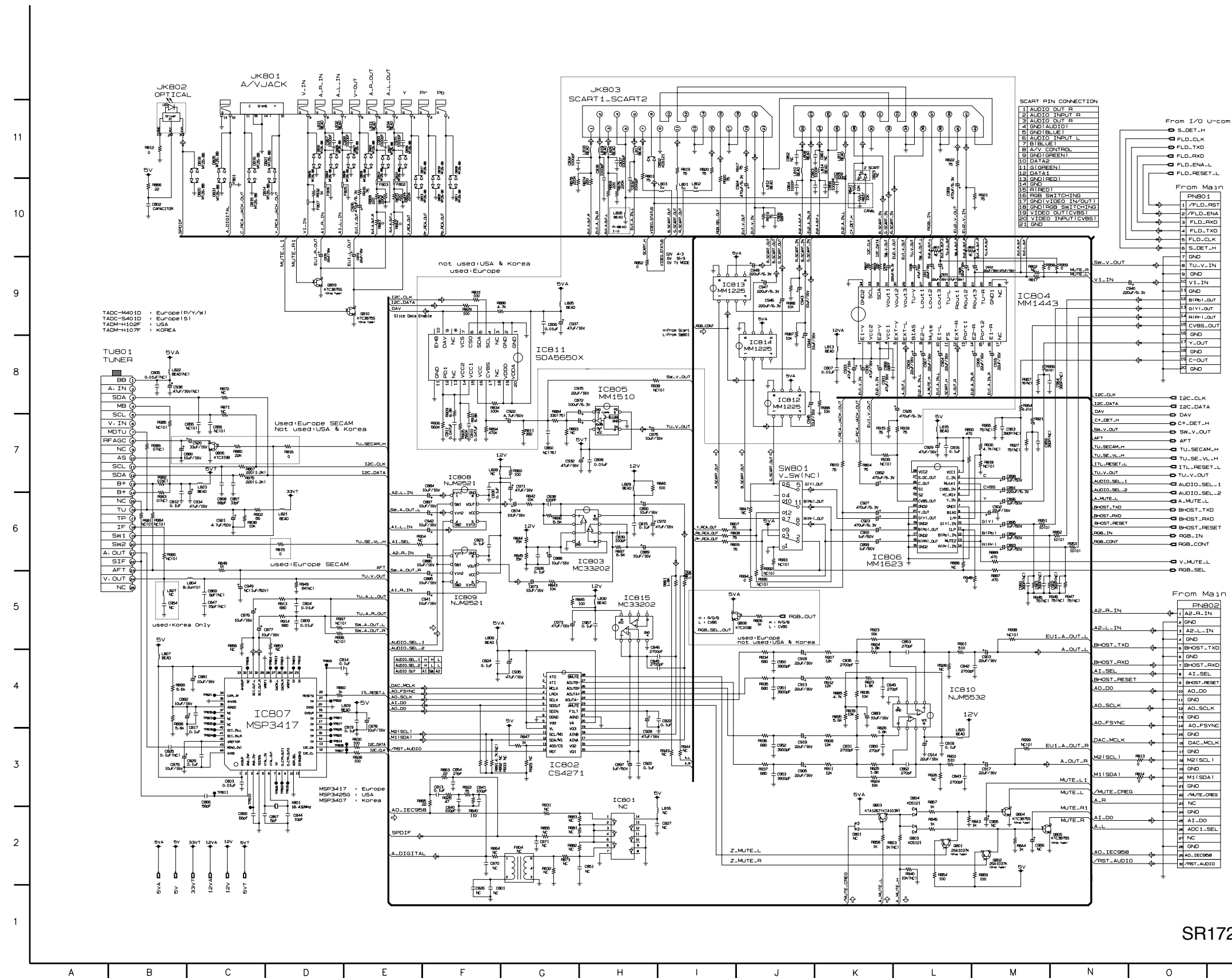
3-54 **3-55**

8. I/O MICOM CIRCUIT DIAGRAM

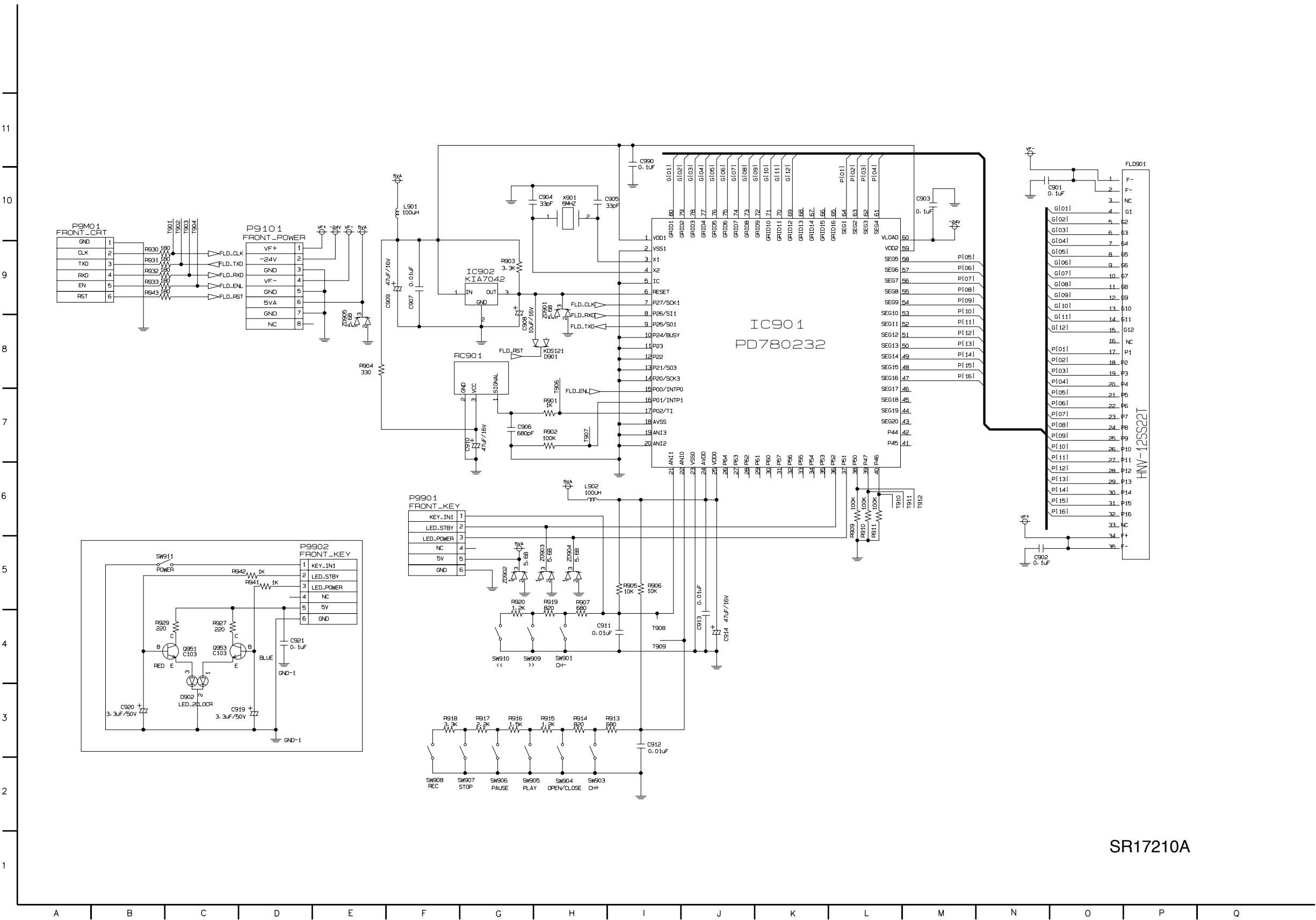


SR17208A

9. I/O JACK CIRCUIT DIAGRAM

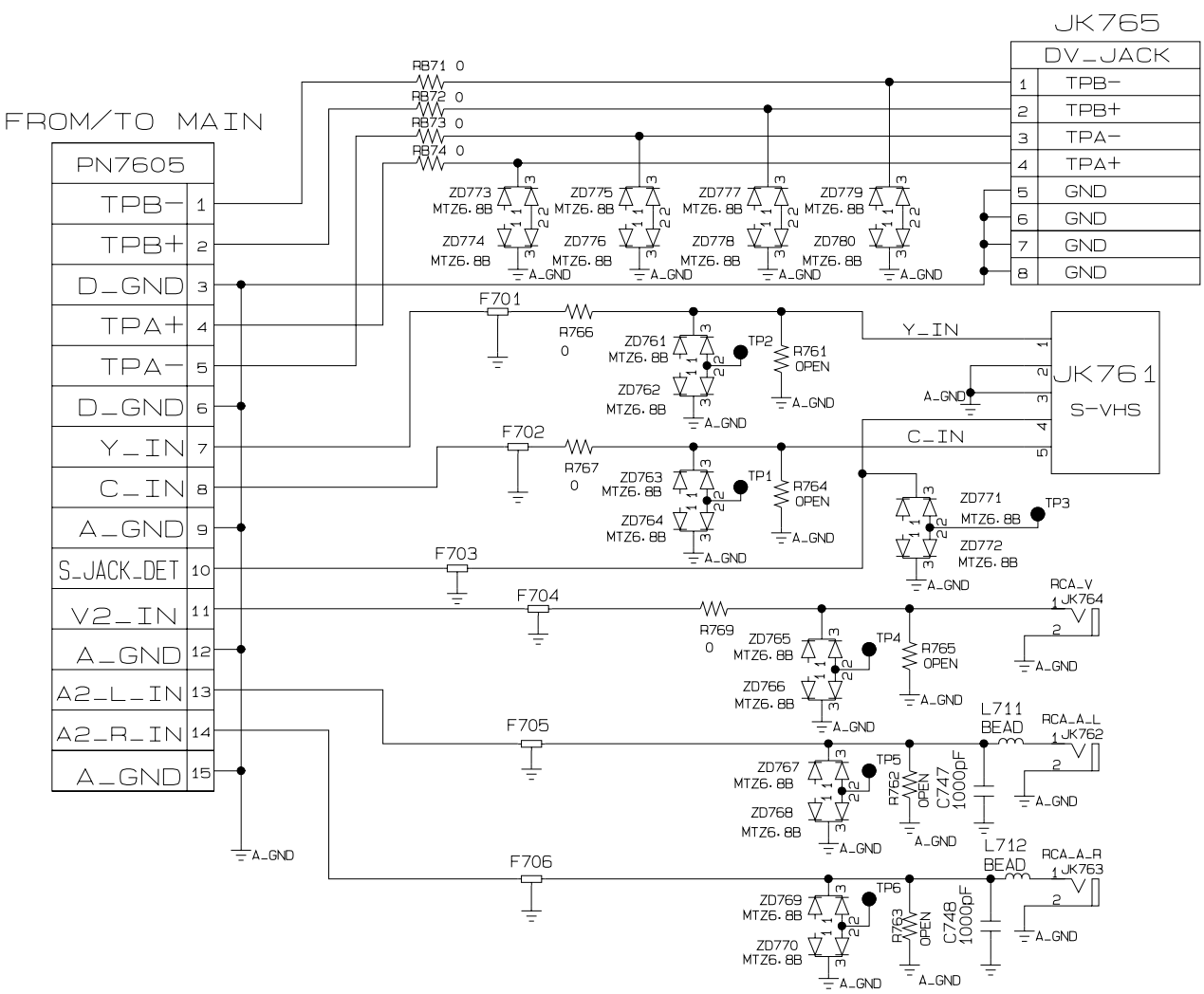


10. FRONT CIRCUIT DIAGRAM

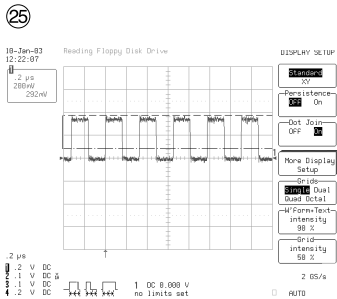


SR17210A

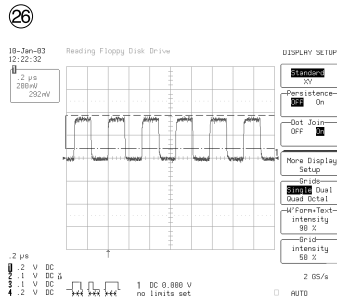
11. FRONT JACK CIRCUIT DIAGRAM



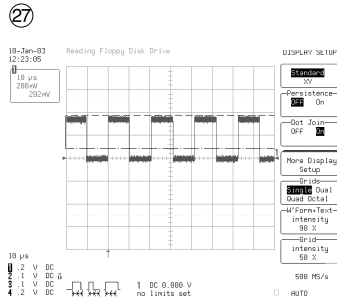
SR17207A



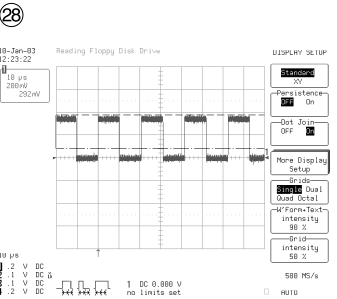
PN7601
PIN4
AI_SCLK



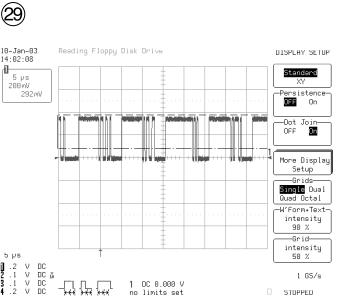
PN7601
PIN19
AO_SCLK



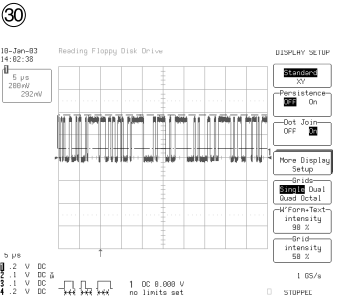
PN7601
PIN8
AI_FSYNC



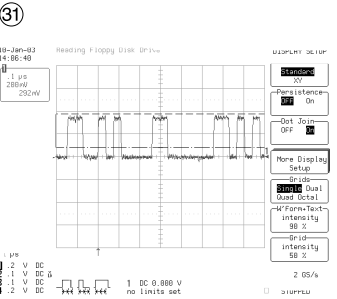
PN7601
PIN17
AO_FSYNC



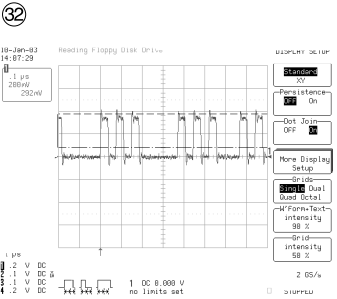
PN7601
PIN6
AI_D0



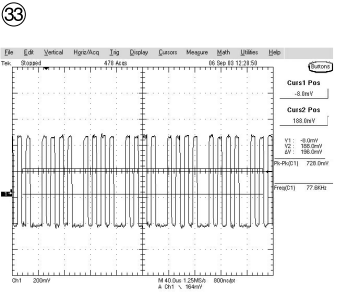
PN7601
PIN21
AO_D0



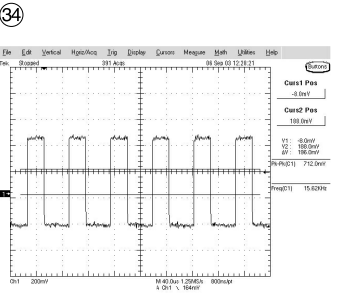
IC4002
PIN40
VO_D0



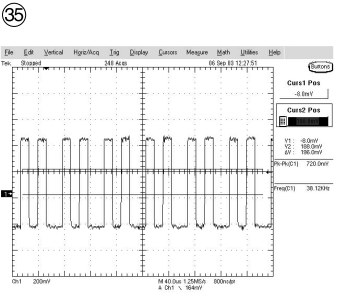
IC4009
PIN90
VI_D0



PN7401
PIN7
R_Pr_OUT



PN7401
PIN8
G_Y_OUT



PN7401
PIN9
B_Pb_OUT

• CIRCUIT VOLTAGE CHART

MODE PIN NO.	EE	PB	REC
IC2066			
1	3.28	3.28	3.28
2	3.28	3.27	3.28
3	0	0	0
4	0	0	0
5	3.28	3.27	3.28
6	0	0	0
7	3.27	3.27	3.28
8	3.28	0	0
9	3.27	3.27	3.28
10	3.27	3.27	3.28
11	0	0	0
12	3.26	3.27	3.28
13	0	0	0
14	3.28	3.27	3.28
15	3.27	3.27	3.28
16	0	0	0
17	3.27	3.27	3.28
18	0	0	0
19	3.26	3.27	3.28
20	3.27	3.27	3.28
21	3.27	3.27	3.28
22	0	0	0
23	3.27	3.27	3.28
24	0	0	0
25	3.28	0	3.28
26	0.05	0.05	0.05
27	3.27	3.27	3.28
28	3.27	3.27	3.28
29	3.27	3.27	3.28
30	0	0	0
31	3.27	3.27	3.28
32	0.19	0	0.3
33	3.27	3.27	3.28
34	3.27	3.27	3.28
35	0	0	0
36	0	0	0
37	0	0	0
38	0	0	0
39	0.02	0	0.42
40	3.28	3.27	3.28
41	3.27	3.27	3.28
42	0	0	0
43	0.04	0.04	0.04
44	0.04	0.04	0.04
IC4009			
1	3.27	3.26	3.27
2	1.85	0.3	0.3
3	3.09	2.35	2.34
4	1.3	0.13	0.02
5	0	0	0
6	1.63	1.55	1.56
7	1.53	1.53	1.52
8	3.3	3.26	3.27
9	0	0	0

MODE PIN NO.	EE	PB	REC
10	0.4	0.61	0.6
11	3.3	3.25	3.26
12	0	0	0
13	1.05	1.06	1.05
14	0	0	0
15	0	0	0
16	0	0	0
17	3.3	3.25	3.26
18	1.03	1.03	1.03
19	1.04	1.04	1.04
20	0	0	0
21	0	0	0
22	0.025	0.02	0
23	3.26	3.25	3.26
24	0	0	0
25	3.27	0.01	3.27
26	0	0	0
27	3.3	3.28	3.28
28	1.66	1.06	1.66
29	0.9	0.05	0
30	3.3	3.26	3.27
31	3.18	3.1	2.8
32	3.2	3.2	3.2
33	3.3	3.26	3.27
34	3.3	3.26	3.27
35	3.3	3.27	3.28
36	2.97	2.96	3
37	1.27	1.28	1.28
38	0	0	0
39	1.64	1.64	1.64
40	1.6	1.61	1.6
41	1.27	1.28	1.28
42	2.36	2.35	2.35
43	3.3	3.27	3.27
44	0	0.08	0
45	1.73	1.72	1.72
46	0	0	0
47	0	0	0
48	0	0	0
49	0	0	0
50	0	0	0
51	3.3	3.27	3.27
52	0	0	0
53	0	0	0
54	0	0	0
55	0	0	0
56	0	0	0
57	0	0	0
58	3.27	3.27	3.27
59	0	0.03	0.03
60	0	0	0
61	0	0	0
62	0	0	0
63	0	0	0
64	0.08	0.06	0

MODE PIN NO.	EE	PB	REC
65	0.09	0.06	0
66	0.1	0.08	0
67	0.1	0.03	0
68	3.3	3.27	3.27
69	0.08	0.08	0
70	0.05	0.05	0
71	0.05	0.04	0
72	0.05	0.04	0
73	2.35	2.35	2.35
74	2.7	0.03	0
75	3.3	0.03	3.27
76	0	0	0
77	2.35	2.35	2.34
78	0	0.02	0
79	2.35	2.34	2.34
80	0	0	0
81	1.98	0.97	2
82	0.42	0.42	0.43
83	3.3	3.27	3.27
84	3.3	3.44	0.45
85	0.71	0.02	0.7
86	0.45	0.45	0.46
87	0.46	0.46	0
88	0	0	0
89	0.47	0.47	0.47
90	0.89	0.89	0
91	0	0.02	0
92	2.7	2.71	2.7
93	3.3	3.27	3.27
94	1.7	1.7	1.7
95	2.05	0	2.05
96	0	0	0
97	2.35	2.34	2.35
98	2.35	2.34	2.34
99	2.35	2.34	2.34
100	0	0	0
IC4003			
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	3.3	3.26	3.27
7	0	0	0
8	3.3	3.27	3.27
9	2.38	2.35	2.37
10	0.2	0.5	0
11	0.18	0.5	0
12	3.3	3.27	3.27
13	0	0	0
14	3.3	3.27	3.28
15	3.2	3.2	3.2
16	0	0.62	0
17	3.27	3.23	3.27
18	3.23	3.23	3.24

MODE PIN NO.	EE	PB	REC
19	1.56	1.56	1.56
20	1.6	1.58	1.58
21	0.4	1.25	0.43
22	0.4	1.25	0.43
23	0.42	1.25	0.34
24	1.35	1.25	0.95
25	3.27	2.27	3.27
26	0	0	0
27	0	0	3.27
28	2.49	2.5	2.5
29	3.25	3.26	3.27
30	2.9	0.6	0
31	1.58	0.59	0
32	3.3	0.42	0
33	0	0	0
34	0	0	0
35	0.62	0.57	0.58
36	1.6	1.58	1.58
37	0.06	0.02	0
38	0.06	0	0
39	0.02	0	0
40	0.02	0	3.15
41	1.23	1.24	1.24
42	0.47	0.5	0.47
43	3.3	3.26	3.27
44	3.3	0	3.27
45	0.47	0.5	0.47
46	1.22	1.25	1.24
47	0.69	0.71	0.7
48	0	0	0
49	0	0	0
50	3	3.25	3.26
51	0	0	0
52	3.3	3.26	3.27
53	3.25	3.26	3.27
54	0	0	0
55	2.38	2.38	2.38
56	2.38	2.37	2.38
57	0	0	0
58	3.28	3.27	3.27
59	0	0	0
60	0.04	0	0.1
61	0.78	1.55	0.8
62	0.42	0.89	0.42
63	0.4	0.89	0.4
64	1.64	1.27	0.96
IC2075			
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	3.27	3.28	3.28

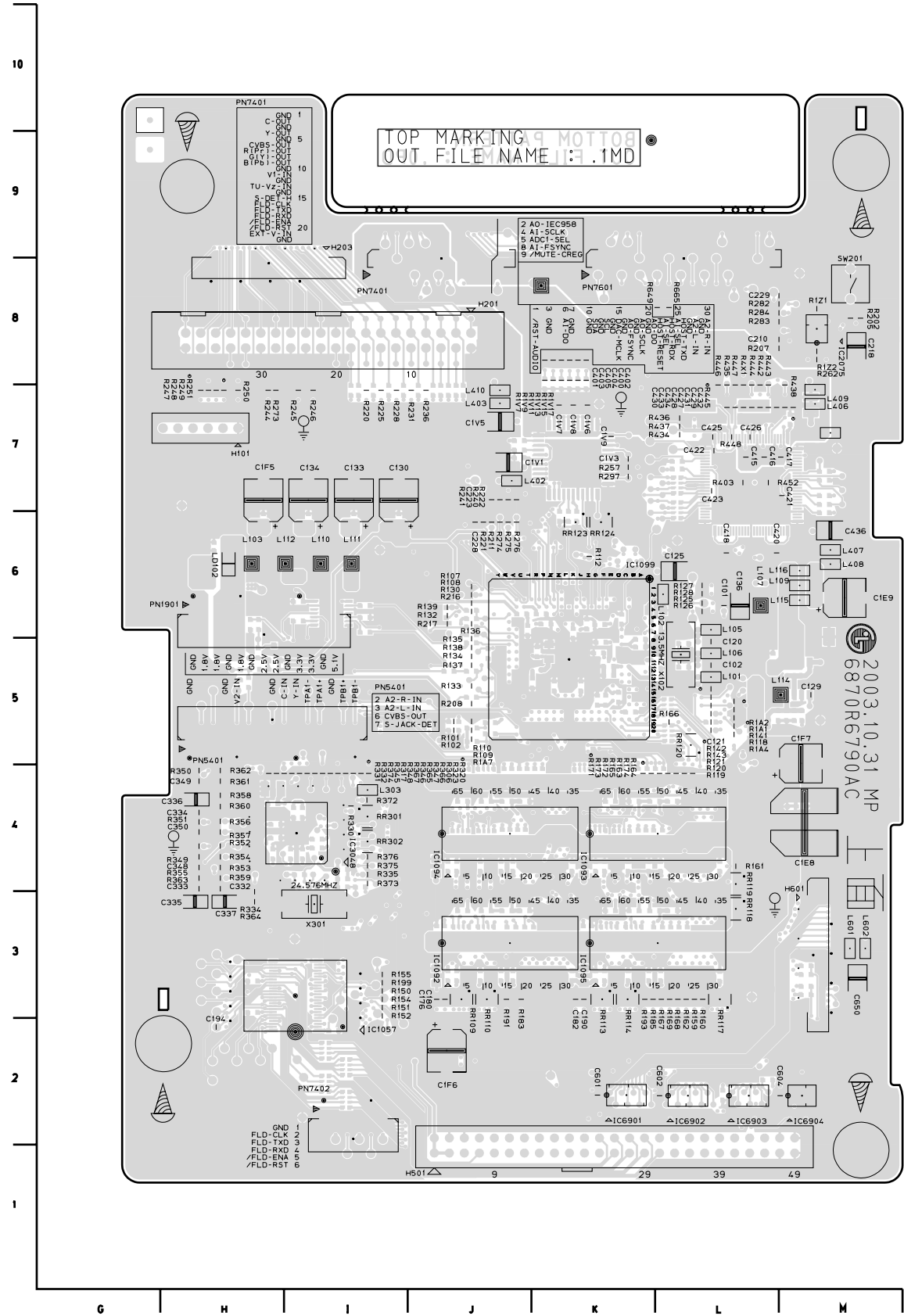
MODE PIN NO.	EE	PB	REC
9	2.94	2.95	2.95
10	3.27	3.28	3.28
11	3.28	3.28	3.28
12	2.95	2.95	2.95
13	3.27	3.28	3.28
14	3.28	3.28	3.28
IC1057			
1	0.03	0.03	0.03
2	0.03	0.03	0.03
3	0.03	0.03	0.03
4	0.03	0.03	0.03
5	0.03	0.03	0.03
6	0.03	0.03	0.03
7	0.03	0.03	0.03
8	0.03	0.03	0.03
9	0.03	0.03	0.03
10	0.03	0.03	0.03
11	3.26	3.28	3.28
12	3.28	3.28	3.28
13	0	0	0
14	3.26	3.28	3.28
15	0	0	0
16	0.03	0.03	0.03
17	0.03	0.03	0.03
18	0.03	0.03	0.03
19	0.03	0.03	0.03
20	0.03	0.03	0.03
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	3.26	3.28	3.28
27	0	0	0
28	3.26	3.28	3.28
29	0	0	0
30	0	0	0
31	0	0	0
32	0	0	0
33	0	0	0
34	0	0	0
35	2.89	2.91	2.989
36	0	0	0
37	2.26	2.26	2.28
38	0	0	0
39	2.91	2.91	2.92
40	0	0	0
41	0	0	0
42	2.9	2.91	2.92
43	0	0	0
44	0	0	0
45	0	0	0
46	0	0	0
47	3.26	3.28	3.28
48	0.03	0.03	0.03

MODE PIN NO.	EE	PB	REC
IC3048			
1	0	0	0
2	1.54	1.56	1.54
3	0	0	0
4	1.04	1.04	0
5	0	0	0
6	3.27	3.27	3.27
7	0.01	0.02	0
8	0.01	0.02	0
9	3.25	3.27	3.26
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	3.27	3.27	3.27
18	0	0	0
19	3.27	3.27	3.26
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	3.26	3.27	3.26
26	3.27	3.27	3.27
27	3.26	3.26	3.27
28	0	0	0
29	3.27	3.27	3.27
30	3.25	3.27	3.27
31	3.25	3.27	3.28
32	0	0	0
33	0	0	0
34	3.25	3.27	3.26
35	3.25	3.27	3.27
36	0	0	0
37	0	0	0
38	0	0	0
39	0	0	0
40	0	0	0
41	0	0	0
42	0	0	0
43	0	0	0
44	3.26	3.27	3.27
45	3.27	3.27	3.27
46	3.27	3.27	3.26
47	3.26	3.27	3.26
48	0	0	0
49	0	0	0
50	0	0	0
51	3.27	3.27	3.27
52	3.27	3.27	3.26
53	3.26	3.26	3.26
54	3.27	3.27	3.27

MODE PIN NO.	EE	PB	REC
55	0	0	0
56	0	0	0
57	3.27	3.26	3.26
58	3.26	3.26	3.26
59	3.26	3.26	3.27
60	0	0	0
61	0	0	0
62	3.25	3.27	3.28
63	3.26	3.27	3.27
64	0	0	0
65	0	0	0
66	0	0	0
67	1.25	1.26	1.27
68	3.26	3.27	3.26
69	0	0	0
70	0	0	0
71	0	0	0
72	1.14	1.15	1.15
73	3.25	3.27	3.25
74	0	0	

PRINTED CIRCUIT DIAGRAMS

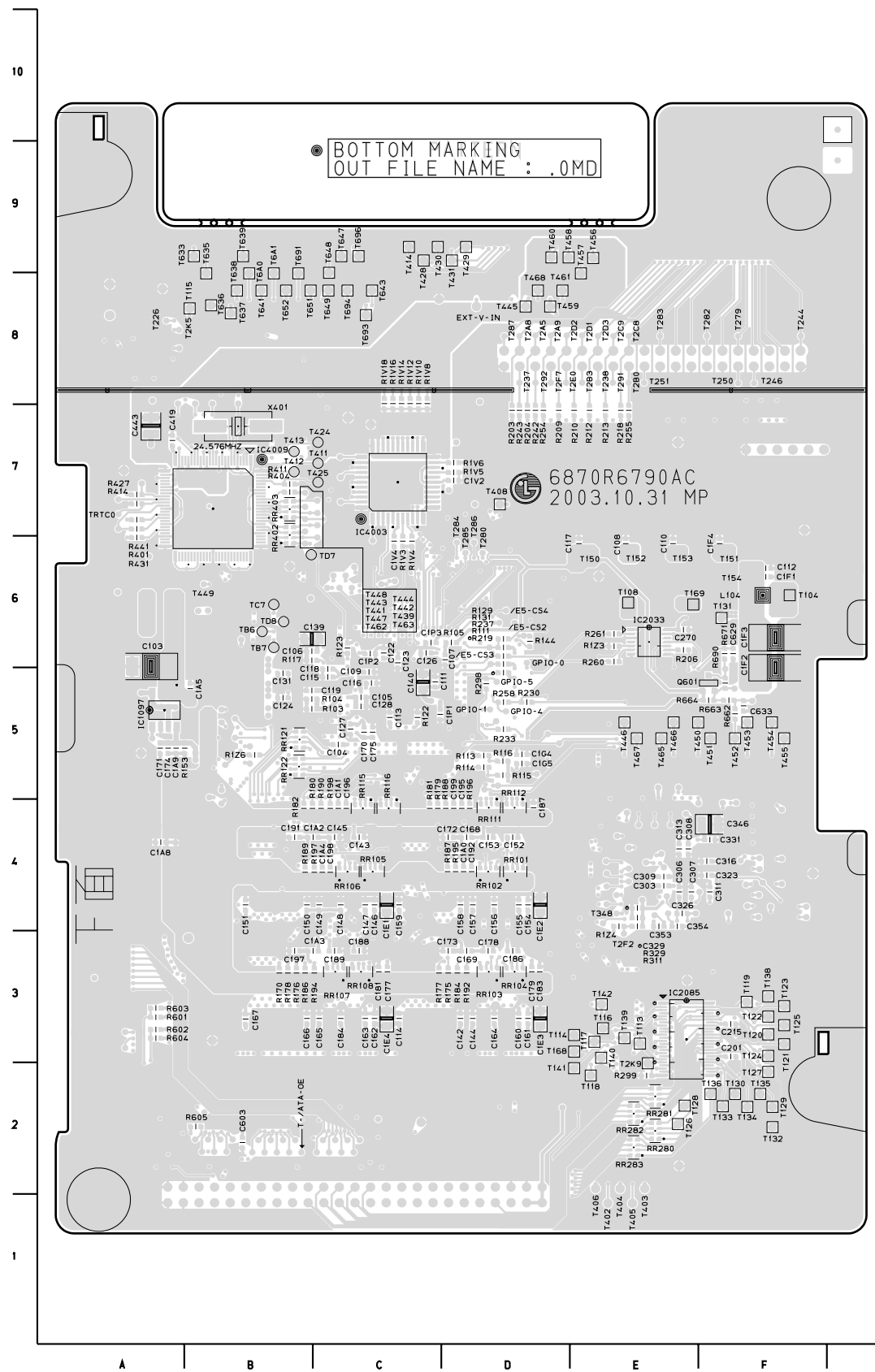
1. MAIN P.C.BOARD(TOP SIDE)



LOCATION GUIDE

C101	L6	C429	L7	PN740	022	R1V13	K8	R354	H4
C102	L5	C430	L7	PN760	018	R1V15	K8	R355	H4
C120	L5	C431	L7	R101	J5	R1V17	K8	R356	H4
C121	L5	C432	M7	R102	J5	R1V7	K8	R357	H4
C125	L6	C433	L7	R107	J6	R1V9	K8	R358	H4
C129	M5	C434	L7	R108	J6	R1Z1	M8	R359	H4
C130	M7	C436	M6	R109	J5	R1Z2	M8	R360	H4
C133	M7	C601	K2	R110	J5	R202	M8	R361	H4
C134	M7	C602	L2	R112	K6	R205	M8	R362	H4
C136	L6	C604	M2	R118	L5	R207	M8	R363	H4
C137	M5	C650	M3	R119	L5	R208	J5	R364	H3
C180	J3	GND1	I7	R120	L5	R211	J6	R365	L4
C182	K3	GND2	K7	R121	L5	R216	J6	R366	L4
C190	K3	GND3	L3	R125	L6	R217	J6	R367	L4
C194	H2	GND4	H4	R126	L6	R220	I7	R372	L4
C1F8	M4	H101	H7	R127	L6	R221	J6	R373	L4
C1F9	M6	H201	J8	R128	L6	R222	J7	R374	L4
C1F5	H7	H203	H8	R130	J6	R225	I7	R375	L4
C1F6	J2	H501	J1	R132	J6	R228	I7	R376	L4
C1F7	M5	H601	M3	R133	J5	R231	J7	R403	L7
C1V1	J7	IC105	I3	R134	J5	R236	J7	R434	L7
C1V3	K7	IC109	I3	R135	J5	R240	J7	R435	L7
C1V5	J7	IC109	I4	R136	J6	R241	J7	R436	L7
C1V6	K7	IC109	I4	R137	J5	R244	H7	R437	L7
C1V7	K7	IC109	I3	R138	J5	R245	I7	R438	M7
C1V8	K7	IC109	I3	R139	J6	R246	I7	R442	L7
C1V9	K7	IC207	I8	R141	L5	R247	H7	R443	L7
C210	M8	IC304	I4	R142	L5	R248	H7	R444	L7
C218	M8	IC690	K2	R143	L5	R249	H7	R445	M7
C223	J7	IC690	I2	R150	I3	R250	H7	R446	L7
C228	M8	IC690	I2	R151	I3	R251	H7	R447	L7
C332	H4	IC690	M2	R152	I3	R257	K7	R448	L7
C333	H4	L101	L5	R154	I3	R262	M8	R452	L7
C334	H4	L102	L6	R155	I3	R273	H7	R4X1	L7
C334	H4	L103	H6	R159	L3	R274	J6	R649	L8
C335	H3	L105	L6	R160	L3	R275	J6	R665	L8
C336	H4	L106	L5	R161	L4	R276	J6	RR109	J3
C337	H3	L107	L6	R162	L3	R282	M8	RR110	J3
C338	H4	L109	M6	R163	L4	R283	M8	RR113	K3
C340	H4	L110	L6	R164	L4	R284	M8	RR114	K3
C350	H4	L111	L6	R165	L4	R297	K7	RR117	L3
C400	K8	L112	L6	R166	L5	R306	I4	RR118	L3
C401	K8	L114	M5	R167	L3	R317	I4	RR119	L4
C402	K8	L115	M6	R168	L3	R320	I4	RR120	L5
C403	K8	L116	M6	R169	L3	R323	I4	RR123	K6
C404	K8	L303	I4	R171	K4	R330	I4	RR124	K6
C405	K8	L402	J7	R172	L4	R331	H4	RR301	I4
C415	L7	L403	J7	R173	K4	R332	H4	RR302	I4
C416	L7	L406	M7	R174	L4	R334	H3	SIDE - H9	H9
C417	M7	L407	M6	R183	J3	R335	I4	SIDE - M9	M9
C418	L6	L408	M6	R185	K3	R345	I4	SIDE - M9	M9
C420	L6	L409	M7	R191	J3	R346	I4	SIDE - H2	H2
C421	M7	L410	J7	R193	K3	R347	I4	SW201	M8
C422	L7	L601	M3	R199	I3	R348	I4	X102	L5
C423	L7	L602	M3	R1A1	L5	R349	H4	X301	I3
C425	L7	LD102	H6	R1A2	L5	R350	H4		
C426	L7	PN190	H6	R1A4	L5	R351	H4		
C427	L7	PN540	H5	R1A7	J5	R352	H4		
C428	L7	PN740	J8	R1V11	K8	R353	H4		

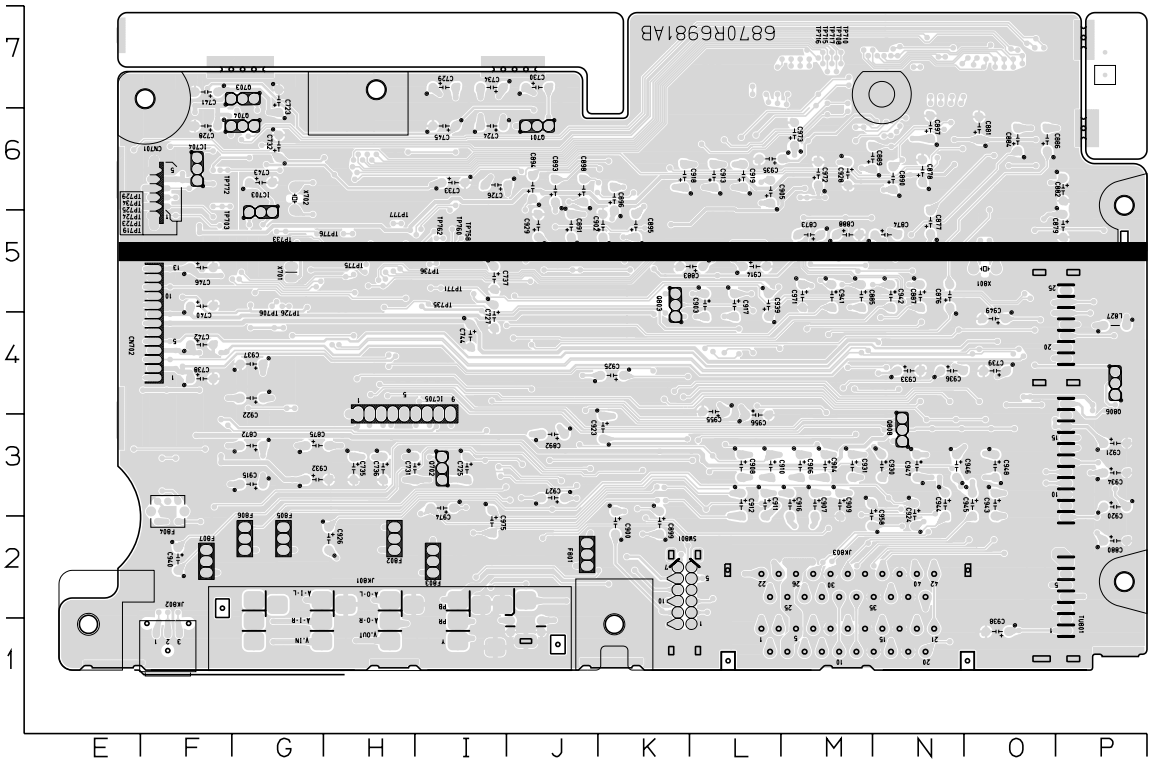
2. MAIN P.C.BOARD(BOTTOM SIDE)



LOCATION GUIDE

/E5+ C008	C164	D3	C329	E4	R1V16	C7	RR281	E2	T279	F8	T343	F4	T641	B8
/E5+ C008	C165	C3	C331	F4	R1V18	C7	RR282	E2	T280	D6	T345	F4	T643	C8
/E5+ C008	C166	B3	C346	F4	R1V3	C6	RR283	E2	T282	F8	T346	F4	T647	C9
A0+D1B4	C167	B3	C353	E4	R1V4	C6	RR402	B7	T283	E8	T348	F4	T648	C8
A0+D2B5	C168	D4	C354	F4	R1V5	D7	RR403	B7	T284	D6	T349	F4	T649	C8
AUTO- 6870	C169	D3	C419	A7	R1V6	D7	T102	B5	T285	D6	T350	F4	T651	B8
AUTO- 6870	C170	C5	C443	A7	R1V8	C7	T103	B5	T286	D6	T401	A7	T652	B8
AUTO- 6870	C171	A5	C603	B2	R1Z3	E6	T104	F6	T287	D8	T402	F1	T691	B8
AUTO- 6870	C172	D4	C629	F6	R1Z4	E4	T105	B5	T291	F8	T403	F2	T693	C8
AUTO- 6870	C173	D3	C633	F5	R1Z6	B5	T106	D5	T292	D8	T404	F2	T694	C8
AUTO- 6870	C174	A5	EXT-V-IN	B8	R203	D7	T108	F6	T2A5	D8	T405	F1	T696	C9
AUTO- 6870	C175	C5	GP10+	D6	R204	D7	T110	B5	T2A8	D8	T406	F2	T6A0	B8
AUTO- 6870	C176	D3	GP10+	D5	R206	E6	T111	B5	T2A9	D8	T408	D7	T6A1	B8
AUTO- 6870	C177	D3	GP10+	D5	R209	D7	T112	B5	T2B0	E8	T411	C7	TA12	B5
AUTO- 6870	C178	D3	GP10+	D5	R210	E7	T113	F3	T2B3	F8	T412	B7	TB6	B6
AUTO- 6870	C179	D3	GP10+	D5	R212	E7	T114	F3	T2C8	F8	T413	B7	TB7	B6
AUTO- 6870	C181	D3	H10RD	B2	R213	E7	T115	B8	T2C9	F8	T414	C9	TC7	B6
AUTO- 6870	C183	D3	HRSTAB	B2	R218	E7	T116	F3	T2D1	F8	T424	C7	TD12	B5
C103	A6	C184	IC109	A7	R219	D5	T117	F3	T2D2	D8	T425	C7	TD7	B6
C104	C5	C186	IC203	B3	R230	D5	T118	E2	T2D3	E8	T428	C9	TD8	B6
C105	C5	C187	IC208	B3	R233	D5	T119	F3	T2D4	A8	T429	D9	TP-T1	B5
C106	B6	C188	IC400	B7	R237	D6	T120	F3	T2E0	D8	T430	C9	TRTC0A	A7
C107	D6	C189	IC400	B7	R242	D7	T121	F3	T2F2	E3	T431	D9	TRTC0A	A7
C108	E6	C191	PA1	B2	R243	D7	T122	F3	T2F7	D8	T436	B7	TU16	D5
C109	C5	C192	PA2	B2	R254	D7	T123	F3	T2K5	A8	T437	B7	T+/AT	B2
C110	F6	C195	PA2	B2	R255	E7	T124	F3	T2K9	E2	T438	A7	T+/ATA	B2
C111	C5	C196	C601	F5	R258	D5	T125	F3	T301	F4	T439	C7	T+/ATA	B2
C112	F6	C197	R103	B5	R260	E6	T126	E2	T302	F4	T440	B7	T+/HD1	B2
C113	C5	C198	R104	B5	R261	E6	T127	F2	T303	F4	T441	B7	T+/HD1	B2
C114	C5	C199	R105	D6	R298	D5	T128	E2	T305	F4	T442	C7	T+/PA0	B2
C115	C5	C1A0	R111	D6	R299	E2	T129	F2	T306	F4	T443	B7	T+/PD0	B2
C116	C5	C1A1	R113	D5	R311	E4	T130	F2	T307	F4	T444	C7	T+/PD1	B2
C117	F6	C1A2	R114	D5	R311	F6	T131	F2	T308	F4	T445	D8	T+/PD1	B2
C118	F6	C1A3	R115	D5	R401	A7	T132	F2	T309	F4	T446	F5	T+/PD1	B2
C119	B5	C1A4	R116	D6	R404	B7	T133	F2	T310	F4	T447	B7	T+/PD1	B2
C120	B5	C1A5	R117	B6	R411	B7	T134	F2	T311	F4	T448	B7	T+/PD1	B2
C123	C6	C1A8	R122	C5	R414	A7	T135	F2	T312	F4	T449	B6	T+/PD1	B2
C124	B5	C1A9	R123	C6	R427	A7	T136	F2	T313	F4	T450	F5	T+/PD1	B2
C126	C6	C1E1	R129	D6	R431	A6	T138	F3	T314	F4	T451	F5	T+/PD2	B2
C127	C6	C1E2	R131	D6	R441	A7	T139	F3	T315	F4	T452	F5	T+/PD3	B2
C128	C5	C1E3	R144	D6	R601	A3	T140	E3	T316	F4	T453	F5	T+/PD4	B2
C131	C5	C1E4	R153	B5	R602	A3	T141	E2	T317	F4	T454	F5	T+/PD5	B2
C139	B6	C1F1	R170	B3	R603	A3	T142	E3	T318	F4	T455	F5	T+/PD6	B2
C140	C5	C1F2	R175	D3	R604	A3	T144	A5	T319	F4	T456	F5	T+/PD7	B2
C142	D3	C1F3	R176	B3	R605	B2	T145	A5	T320	F5	T457	F5	T+/PD8	C2
C143	C3	C1F4	R177	C3	R662	F5	T148	A4	T321	F4	T458	D9	T+/PD9	C2
C144	D3	C1G4	R178	B3	R663	F5	T149	B5	T322	F4	T459	D8	T+/U9	D6
C145	C4	C1G5	R179	C4	R664	F5	T150	E6	T323	F4	T460	D9	T+/V10	C6
C146	C4	C1P1	R180	B4	R671	F6	T151	F6	T324	F4	T461	D8	T+/V11	C6
C148	C4	C1P3	R182	B4	R690	F5	T152	E6	T325	F4	T462	B6	T+/V12	C6
C149	C4	C1V2	R184	D3	RR101	D4	T153	E6	T326	F4	T463	C6	T+/V13	C6
C150	B4	C1V4	R186	B3	RR102	D4	T154	F6	T328	F4	T465	F5	T+/V14	C6
C151	B4	C201	R187	D4	RR103	D3	T164	D5	T329	F4	T466	F5	T+/V15	C6
C152	D4	C215	R188	D4	RR104	D3	T165	D5	T330	F4	T467	F5	T+/V8	C6
C153	D4	C270	R189	B4	RR105	C4	T166	D5	T331	F4	T468	D8	T+/V9	C6
C154	D4	C303	R190	C4	RR106	C4	T168	E3	T332	F4	T469	A7	T+/VE1	C6
C155	D4	C306	R192	D3	RR107	C3	T169	E6	T333	F4	T480	F5	T+/VE3	C7
C156	D4	C307	R194	C3	RR108	C3	T171	B6	T334	F4	T481	F5	T+/VE3	C7
C157	D4	C308	R195	D4	RR111	D4	T226	A8	T335	F4	T625	F5	T+/VE4	C7
C158	D4	C309	R196	D4	RR112	D4	T237	D8	T336	F4	T633	B9	T+/W4	D6
C159	D4	C311	R197	C4	RR115	C4	T238	E8	T338	F4	T635	B8	T+/W4	D6
C160	D3	C313	R198	C4	RR116	C4	T244	F8	T339	F4	T636	B8	X401	B7
C161	D3	C316	R1V10	C7	RR121	B5	T246	F8	T340	F4	T637	B8		
C162	D3	C323	R1V12	C7	RR122	B5	T250	F8	T341	F4	T638	B8		
C163	C3	C326	R1V14	C7	RR280	E2	T251	E8	T342	F4	T639	B9		

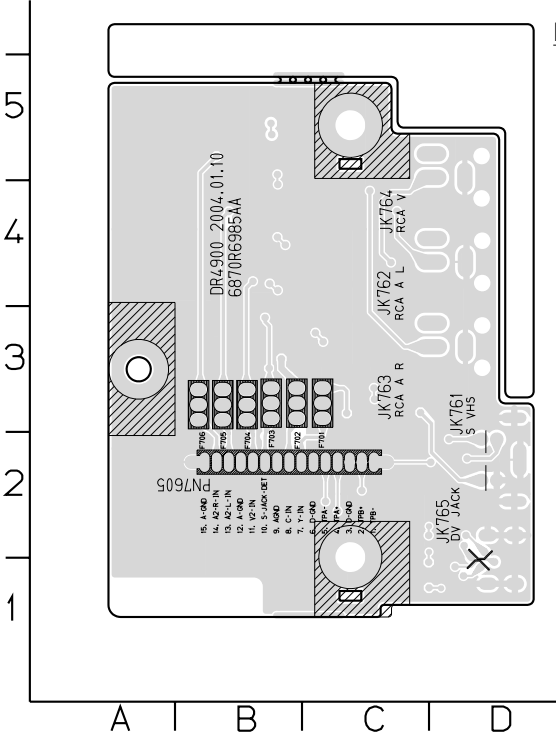
3. I/O P.C.BOARD



LOCATION GUIDE

C701	J7	C803	05	C856	02	C907	M3	C957	M6	D822	H2	JK765	B5	PIN0009 F3	PIN0122 M7	R710	G5	R770	H4	R855	F3	R8A6	M6	R946	M7	TP712	H6	TP811	O5
C702	G5	C804	M4	C857	03	C908	L3	C958	M3	D823	M2	JK801	H1	PIN0010 F3	PIN0124 M5	R711	F6	R801	N2	R856	06	R8A7	J2	R947	L7	TP714	H6	TP812	O6
C703	I5	C805	01	C858	L2	C909	M3	C959	L6	D824	G2	JK802	F1	PIN0011 F3	PIN0129 M6	R712	F6	R802	L3	R857	L4	R8A8	L2	R948	K5	TP718	H4	TP813	O6
C704	G4	C806	G4	C859	M2	C910	M3	C960	L6	D825	J2	JK803	M1	PIN0013 M5	PIN0136 M4	R713	H4	R803	L4	R858	K5	R8A9	L2	R949	N4	TP720	H4	TP814	N6
C705	I5	C807	N3	C860	F4	C911	L3	C961	L7	D826	G2	L701	I5	PIN0014 05	PIN0137 M4	R714	H3	R804	J2	R859	L4	R8C1	03	R951	L6	TP721	I5	TP815	N5
C706	H4	C808	G3	C861	L2	C912	L3	C962	L7	D827	G2	L702	F6	PIN0015 F4	PIN0138 M4	R715	F6	R806	H4	R860	N6	R8C2	N3	R952	M7	TP722	I5	TP816	O6
C707	H6	C809	M4	C862	L2	C913	L6	C963	L7	D828	G2	L703	I5	PIN0016 L5	PIN0140 J5	R716	G5	R807	J2	R861	N6	R8C3	03	R953	L7	TP728	H5	TP817	N6
C708	H6	C810	G3	C863	M2	C914	L5	C964	L6	D829	F2	L704	G4	PIN0017 L6	PIN0141 K5	R717	H4	R808	K1	R862	N6	R900	L5	R954	L7	TP730	G5	TP818	O6
C709	H3	C811	G3	C864	L2	C915	G3	C965	N2	D830	F2	L711	B3	PIN0018 K6	PIN0142 J5	R718	G5	R809	K2	R863	F3	R901	L5	R955	L7	TP731	H4	TP819	O6
C710	I6	C812	P3	C865	05	C916	M3	C966	M3	D831	J2	L712	B3	PIN0019 K6	PIN0143 J4	R719	F6	R810	J2	R864	F3	R902	03	R956	L6	TP732	H4	TP820	N6
C711	I5	C813	F3	C866	05	C917	L5	C967	G2	F701	C4	L713	N2	PIN0020 N6	PIN0147 N6	R720	I5	R811	I3	R865	F2	R903	G3	R957	L6	TP737	H4	TP821	O6
C712	F6	C814	N6	C867	05	C918	K6	C968	G2	F702	C4	L802	O2	PIN0021 M5	PIN0149 H4	R721	H4	R812	F2	R866	F2	R905	G3	R958	L3	TP738	I5	TP822	N6
C713	G5	C815	M6	C868	03	C919	L6	C969	H2	F703	C4	L803	N3	PIN0022 F3	PIN0150 M4	R722	G6	R813	07	R867	03	R906	G3	R959	L3	TP740	H4	TP823	O6
C714	I5	C816	J5	C869	05	C920	P3	C970	H2	F704	C3	L804	05	PIN0026 05	PIN0156 G3	R723	G4	R814	07	R868	I2	R907	K6	R960	M5	TP742	H4	TP824	O6
C715	G6	C817	06	C870	F3	C921	P3	C971	M5	F705	C3	L805	M2	PIN0027 L5	PIN0157 G4	R724	G5	R815	04	R869	L2	R908	L6	R980	P4	TP743	I6	TP825	N6
C716	G5	C818	L5	C871	F3	C922	G4	C972	M6	F706	C3	L806	M6	PIN0028 L5	PIN0158 G4	R725	I3	R816	04	R870	H3	R909	G3	R981	P3	TP744	I4	TP826	O5
C717	G6	C819	N6	C872	G3	C923	K3	C973	M6	F801	J2	L807	N6	PIN0029 F3	PIN0173 04	R726	I6	R817	L3	R871	02	R910	G3	R982	P3	TP745	H4	TP801	P1
C718	H3	C820	N6	C873	M5	C924	N3	C974	I3	F802	H2	L808	M2	PIN0030 L5	PIN0185 L4	R727	I7	R818	K5	R872	02	R911	L6	R983	P3	TP747	O5	X701	G5
C719	H3	C822	M6	C874	M5	C925	K4	C975	I2	F803	I2	L809	N6	PIN0031 L5	PIN0186 L4	R728	H3	R819	02	R873	F3	R912	L6	R984	P3	TP748	I4	X702	G6
C720	H3	C823	M5	C875	G3	C926	H2	ON701	F5	F804	F3	L810	L2	PIN0033 L5	PIN0189 J2	R730	F6	R820	02	R874	L2	R913	M4	R985	P2	TP749	I4	X801	O5
C721	I7	C824	N6	C876	N5	C927	J3	ON702	F4	F805	G2	L811	M2	PIN0033 L5	PIN0210 I6	R731	H6	R821	L6	R875	03	R914	M4	R986	N2	TP750	I4	ZD761	B4
C722	M7	C825	05	C877	N5	C928	M6	D701	H6	F806	G2	L812	N2	PIN0040 H6	PIN0211 H6	R732	G6	R822	N2	R876	L2	R915	J4	R987	M2	TP752	I5	ZD762	C4
C723	G7	C826	F2	C878	N6	C929	J5	D703	H6	F807	F2	L813	N4	PIN0042 H6	PIN0212 H6	R733	H6	R823	L6	R877	H3	R916	H2	R988	M2	TP753	I5	ZD763	B4
C724	I6	C827	F4	C879	P5	C930	N3	D704	H6	IC701	G5	L814	L2	PIN0049 L4	PIN0213 H6	R734	G5	R824	L5	R878	L2	R917	N2	R989	P2	TP754	I5	ZD764	C4
C725	I3	C828	N5	C880	P2	C931	M3	D705	H6	IC702	H5	L815	J5	PIN0051 L4	PIN0214 H6	R736	G6	R825	L5	R879	I2	R918	J4	R992	K2	TP755	I5	ZD765	B3
C726	I6	C829	06	C881	06	C932	G3	D706	H6	IC703	G5	L816	F4	PIN0053 I2	PN7605 C5	R737	I5	R826	L6	R880	04	R919	N2	R993	L1	TP756	I5	ZD766	C3
C727	I4	C830	M5	C882	P6	C933	N4	D707	H6	IC704	F6	L817	M2	PIN0055 H3	PN801 M7	R738	I5	R827	M4	R881	F3	R920	N2	R994	J2	TP757	I5	ZD767	C3
C728	F6	C831	L6	C883	L5	C934	P3	D708	H6	IC705	H4	L818	L2	PIN0057 H3	PN802 07	R739	I7	R828	04	R882	F3	R921	N2	R995	K1	TP759	I5	ZD768	C3
C729	I7	C832	M2	C884	06	C935	L6	D710	F6	IC706	J7	L819	M2	PIN0059 I2	Q701 J6	R740	J6	R829	H4	R883	F3	R922	F3	R996	M4	TP761	I5	ZD769	C2
C730	J7	C834	L2	C885	M5	C936	N4	D801	N6	IC801	F3	L820	L5	PIN0061 H3	Q702 I3	R741	I3	R830	04	R884	F3	R923	K5	R997	M4	TP763	H5	ZD770	C2
C731	H3	C835	L6	C886	06	C937	G4	D802	M2	IC802	N7	L821	04	PIN0066 I2	Q703 G7	R742	I3	R831	H4	R885	L5	R924	L5	R998	L3	TP764	H5	ZD771	B4
C732	G6	C836	M2	C887	N5	C938	01	D803	L4	IC803	M6	L822	02	PIN0068 I2	Q704 G6	R743	F5	R832	F3	R886	G4	R925	F3	R999	L3	TP765	H5	ZD772	B4
C733	I6	C837	L2	C888	M5	C939	L5	D804	L4	IC804	M4	L823	04	PIN0070 J2	Q801 L4	R744	I3	R833	M4	R887	H6	R926	L5	R871	C5	TP766	G5	ZD773	B5
C734	I7	C838	N6	C889	N6	C940	F2	D805	I2	IC805	G3	L825	G4	PIN0074 F2	Q802 L4	R745	H3	R834	G4	R888	J5	R927	L6	R872	C5	TP767	H5	ZD774	B5
C735	H3	C839	M6	C890	N6	C941	M5	D806	H2	IC806	K5	L826	L6	PIN0081 G3	Q803 K5	R746	H6	R836	L6	R889	J5	R928	K5	R873	C5	TP768	H5	ZD775	B5
C736	H3	C840	F3	C891	J5	C942	N5	D807	H2	IC807	06	L827	P4	PIN0083 J2	Q804 L3	R747	I3	R837	M2	R890	J5	R929	N7	R874	C5	TP769	H5	ZD776	B5
C737	I5	C841	F3	C892	J3	C943	03	D808	I2	IC808	N5	L828	M5	PIN0086 G3	Q805 L3	R750	H6	R838	03	R891	N7	R930	J5	SW801	L1	TP770	G6	ZD777	B5
C738	F4	C842	K5	C893	J6	C944	N3	D809	H2	IC809	M5	L829	M6	PIN0089 F2	Q806 P4	R751	I6	R839	L6	R892	07	R931	F3	TP1	B4	TP773	I5	ZD778	B5
C739	04	C843	L5	C894	J6	C945	03	D810	H2	IC810	L5	L830	M6	PIN0092 I5	Q808 N3	R752	J6	R840	F3	R893	F3	R932	F2	TP2	B4	TP774	I5	ZD779	C5
C740	F5	C844	05	C895	K5	C946	N3	D811	I2	IC811	G4	L831	G2	PIN0095 H4	Q809 I2	R753	I4	R841	M2	R894	G4	R933	N7	TP3	C3	TP778	H6	ZD780	C5
C741	F7	C845	N6	C896	K6	C947	N3	D812	H2	IC812	N3	L832	G2	PIN0096 H4	Q810 H3	R754	I4	R842	N6	R895	L5	R934	L6	TP4	B3	TP801	N6		
C742	F4	C846	N6	C897	N6	C948	03	D813	I2	IC813	03	L833	H2	PIN0097 H4	R701 F6	R755	G5	R843	M5	R896	N6	R935	L6	TP5	C2	TP802	N5		
C743	G6	C847	L5	C898	J6	C949	04	D814	I2	IC814	N3	L834	H2	PIN0099 H4	R702 G6	R761	B4	R844	M5	R897	M6	R936	L6	TP6	C2	TP803	O6		
C744	I4	C849	L5	C899	K2	C950	L6	D815	J2	IC815	M6	PIN0001 H6	PIN0101 H6	R703 F5	R762	B3	R845	N5	R898	06	R937	L6	TP701	H4	TP804	O6			
C745	I6	C850	L5	C900	K2	C951	L6	D816	J2	J801	L2	PIN0003 I5	PIN0102 H6	R704 G4	R763	B2	R846	L4	R899	06	R938	I3	TP702	I6	TP805	O6			
C746	F5	C902	K5	C952	L6	D817	I2	J802	L2	PIN0004 I5	PIN0103 H6	R705 H6	R764	B4	R84	N6	R8A1	K3	R940	M3	R943	N6	TP705	I6	TP806	O6			
C747	B3	C902	L5	C953	L6	D818	F2	JK761	A4	PIN0005 I5	PIN0104 H6	R706 05	R765	B3	R848	04	R8A2	K3	R941	M3	R943	N6	TP707	I6	TP807	N5			
C748	B3	C853	K5	C904	M3	C954	P5	D819	I2	JK762	B3	PIN0006 M4	PIN0107 F3	R707 H3	R766	C4	R852	M2	R8A3	H3	R943	N6	TP707	I6	TP808	N5			
C801	F2	C854	F3	C905	L6	C955	L4	D820	F2	JK763	B3	PIN0007 M4	PIN0108 F3	R708 F6	R767	C4	R853	06	R8A4	I2	R944	N6	TP709	H6	TP809	N6			
C802	F2	C855	02	C906	M3	C956	L3	D821	I2	JK764	B2	PIN0008 G4	PIN0109 F3	R709 I5	R769	C3	R854	L4	R8A5	M6	R945	L6	TP711	H4	TP810	O5			

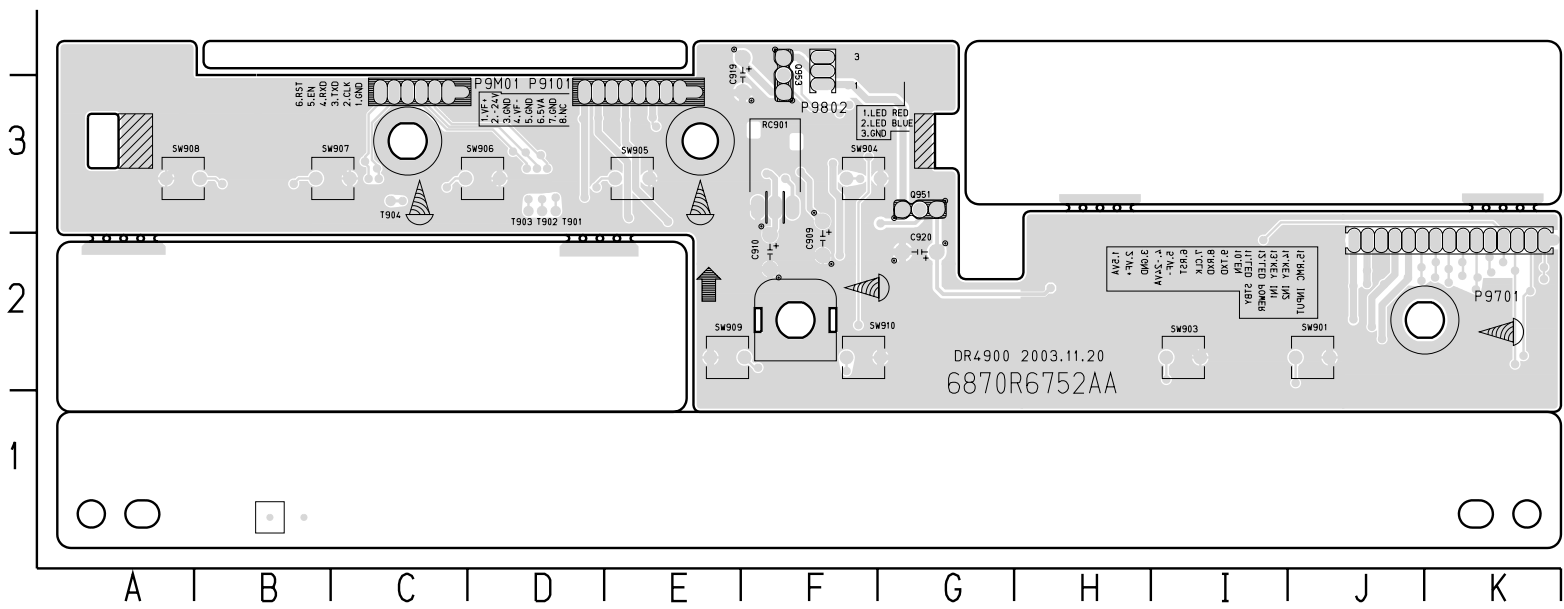
4. JACK P.C.BOARD



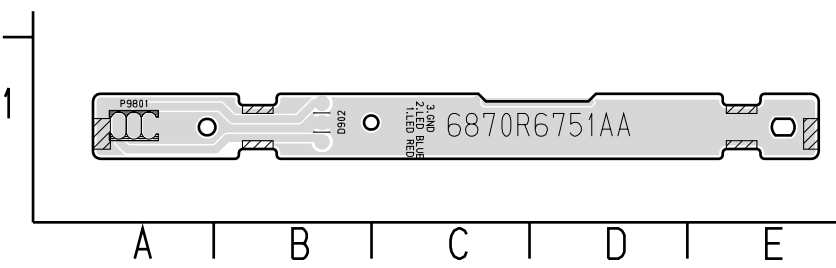
LOCATION GUIDE

C747	C4	RB71	D2
C748	B5	RB72	C2
F701	C3	RB73	C2
F702	B3	RB74	C2
F703	B3	ZD761	C3
F704	B3	ZD762	C3
F705	B3	ZD763	C3
F706	B3	ZD764	B3
JK761	D2	ZD765	B4
JK762	D4	ZD766	B4
JK763	D3	ZD767	B4
JK764	D5	ZD768	B4
JK765	D1	ZD769	B5
L711	C4	ZD770	B5
L712	B5	ZD771	B4
PN7605	C2	ZD772	C4
R761	C3	ZD773	D1
R762	C4	ZD774	C1
R763	C5	ZD775	D2
R764	C3	ZD776	C2
R765	C4	ZD777	D2
R766	C3	ZD778	C2
R767	B3	ZD779	D2
R769	B4	ZD780	C2

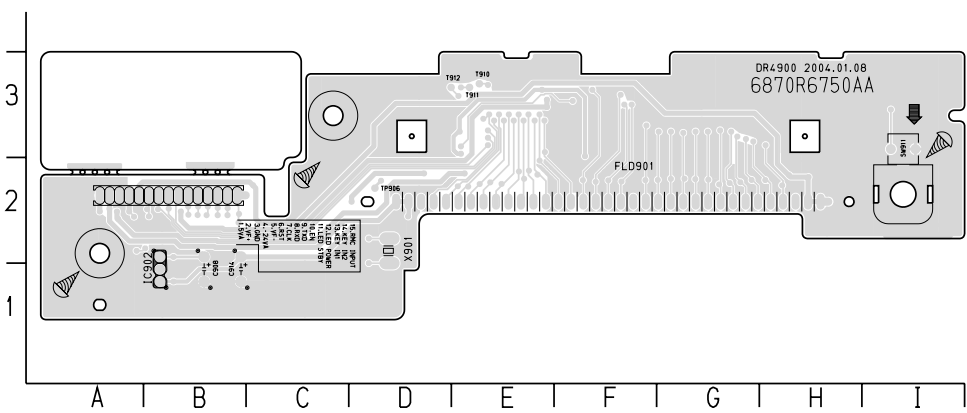
5. FRONT P.C.BOARD



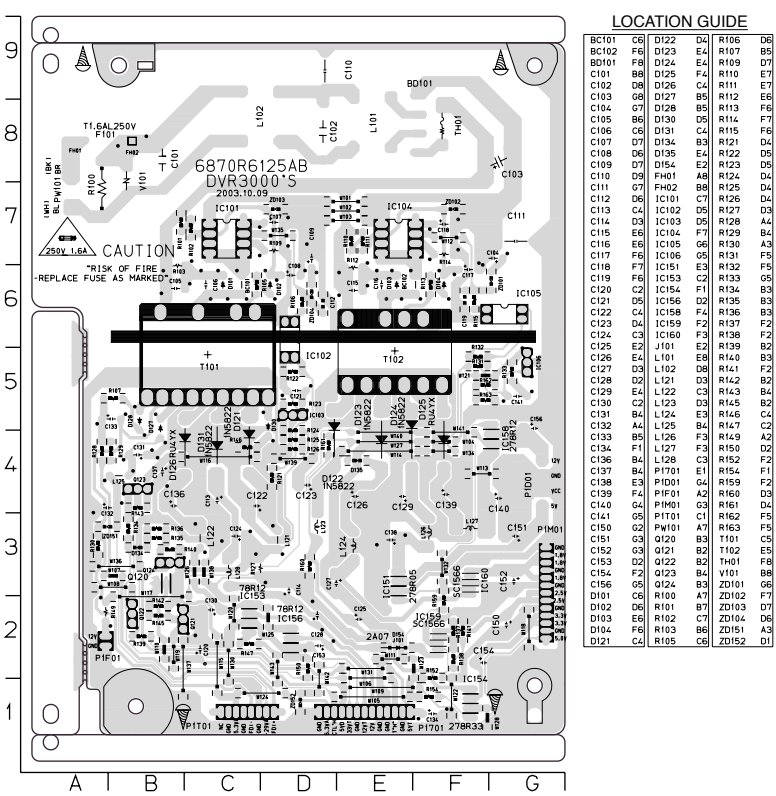
6. LED P.C.BOARD (9TOOL ONLY)



7. KEY P.C.BOARD

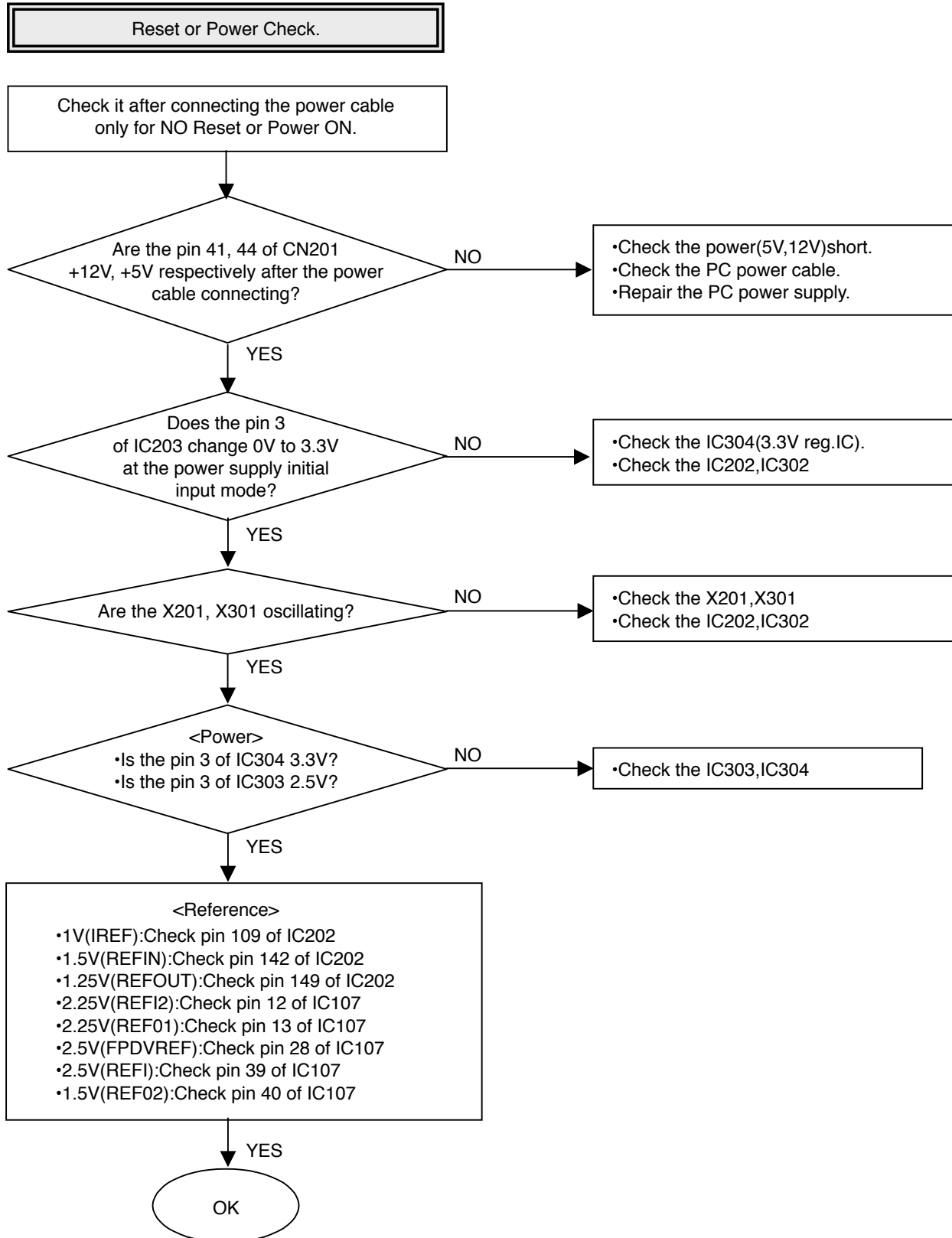


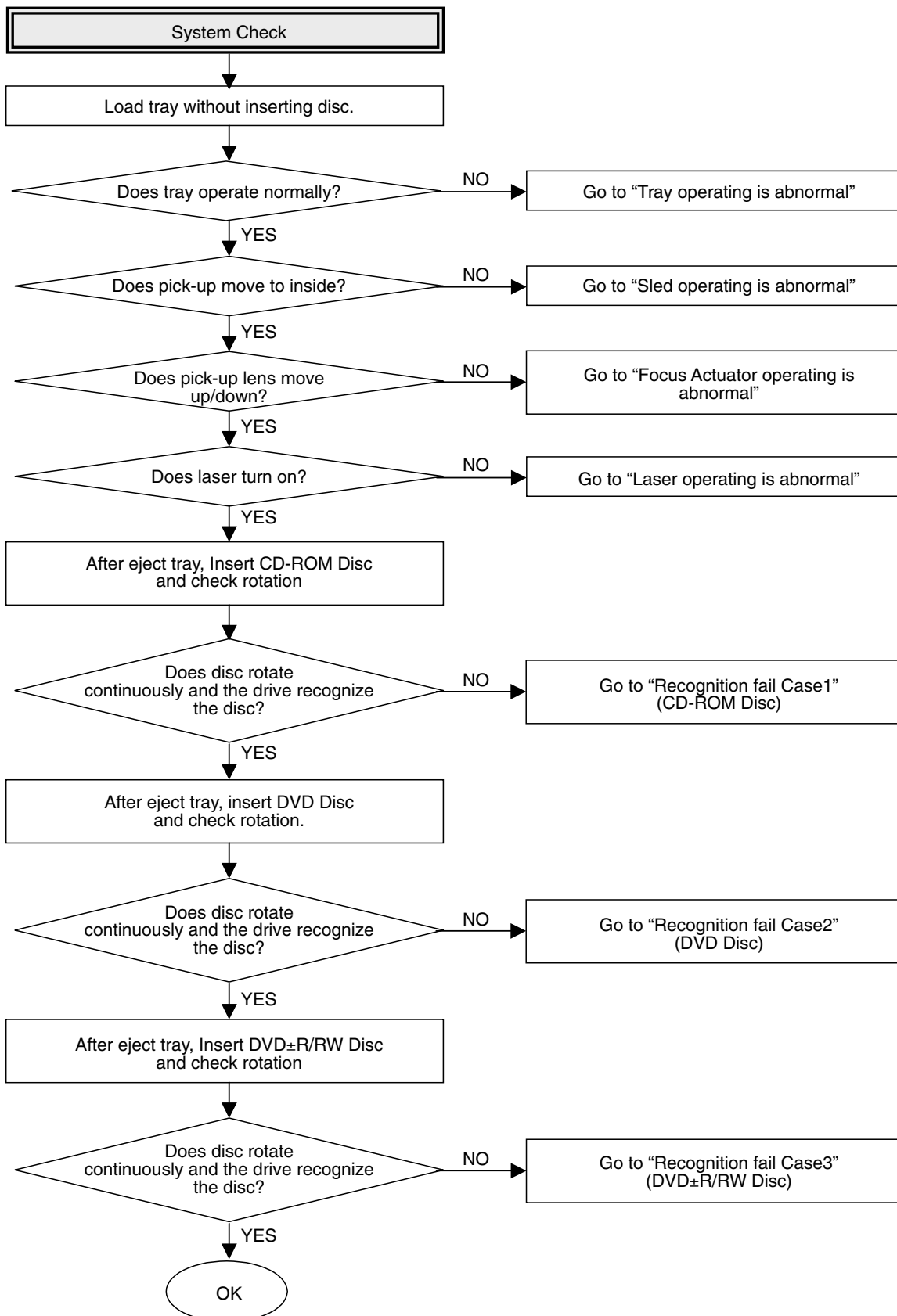
8. POWER P.C.BOARD

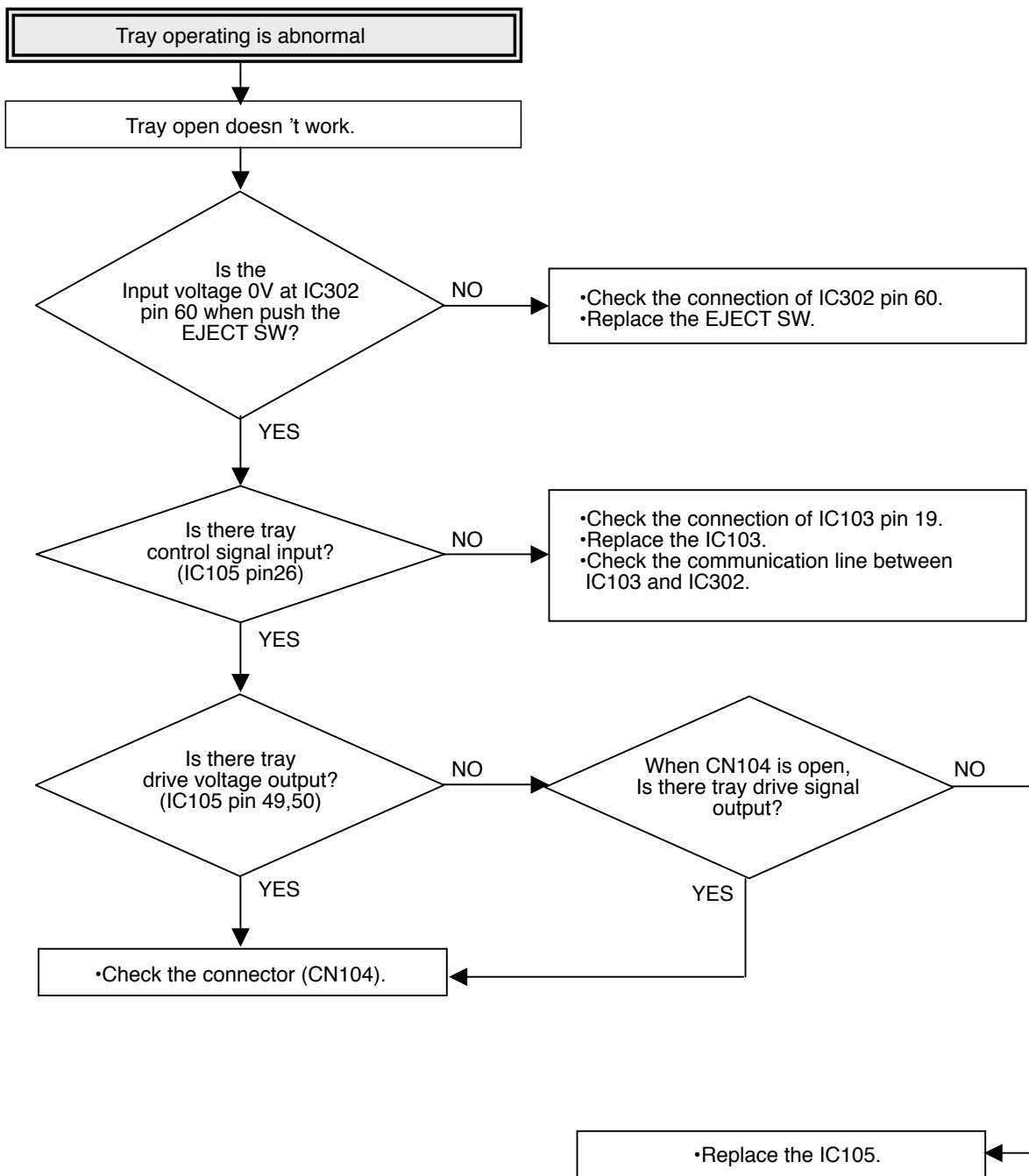


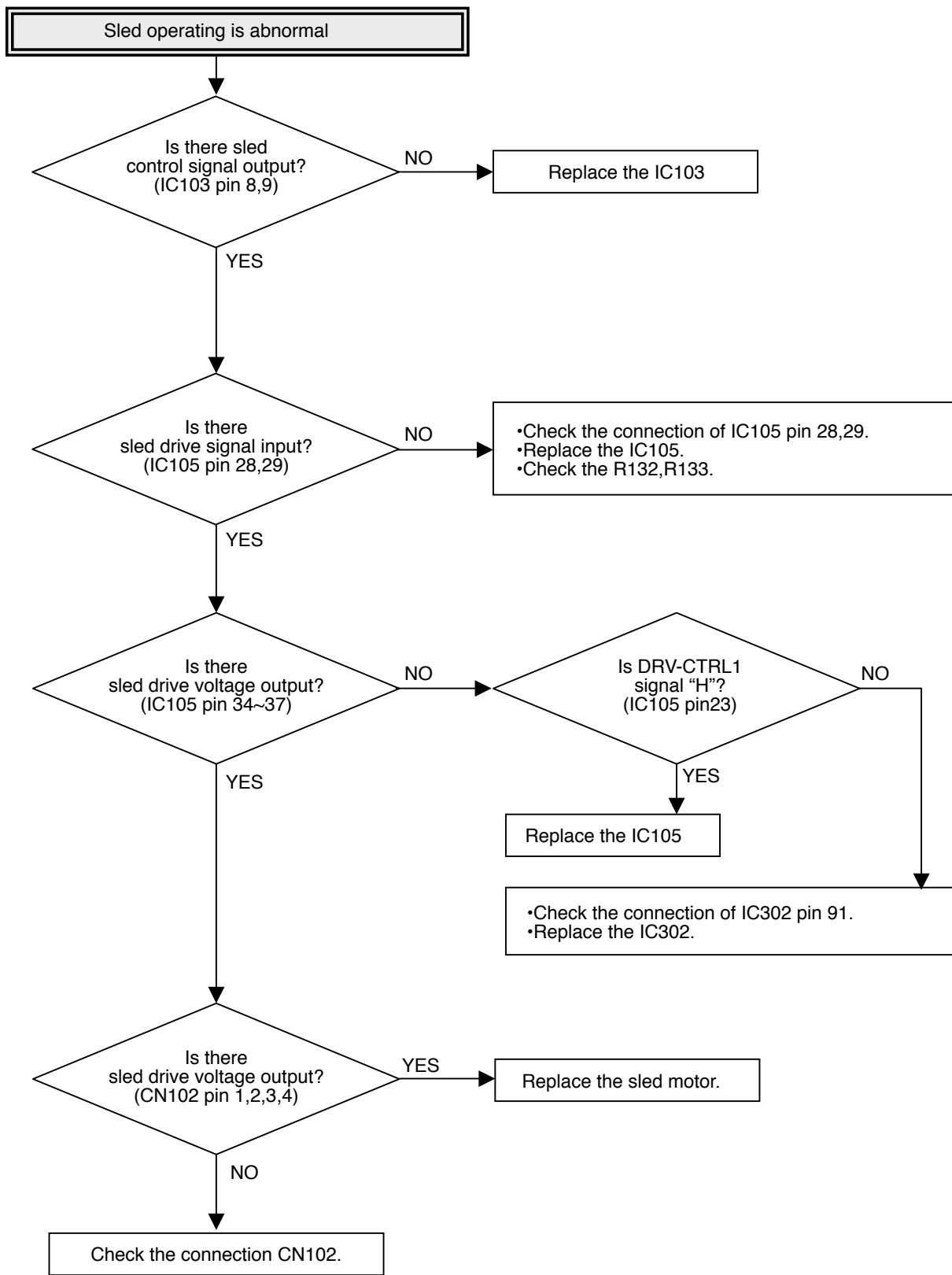
RL-01A LOADER PART

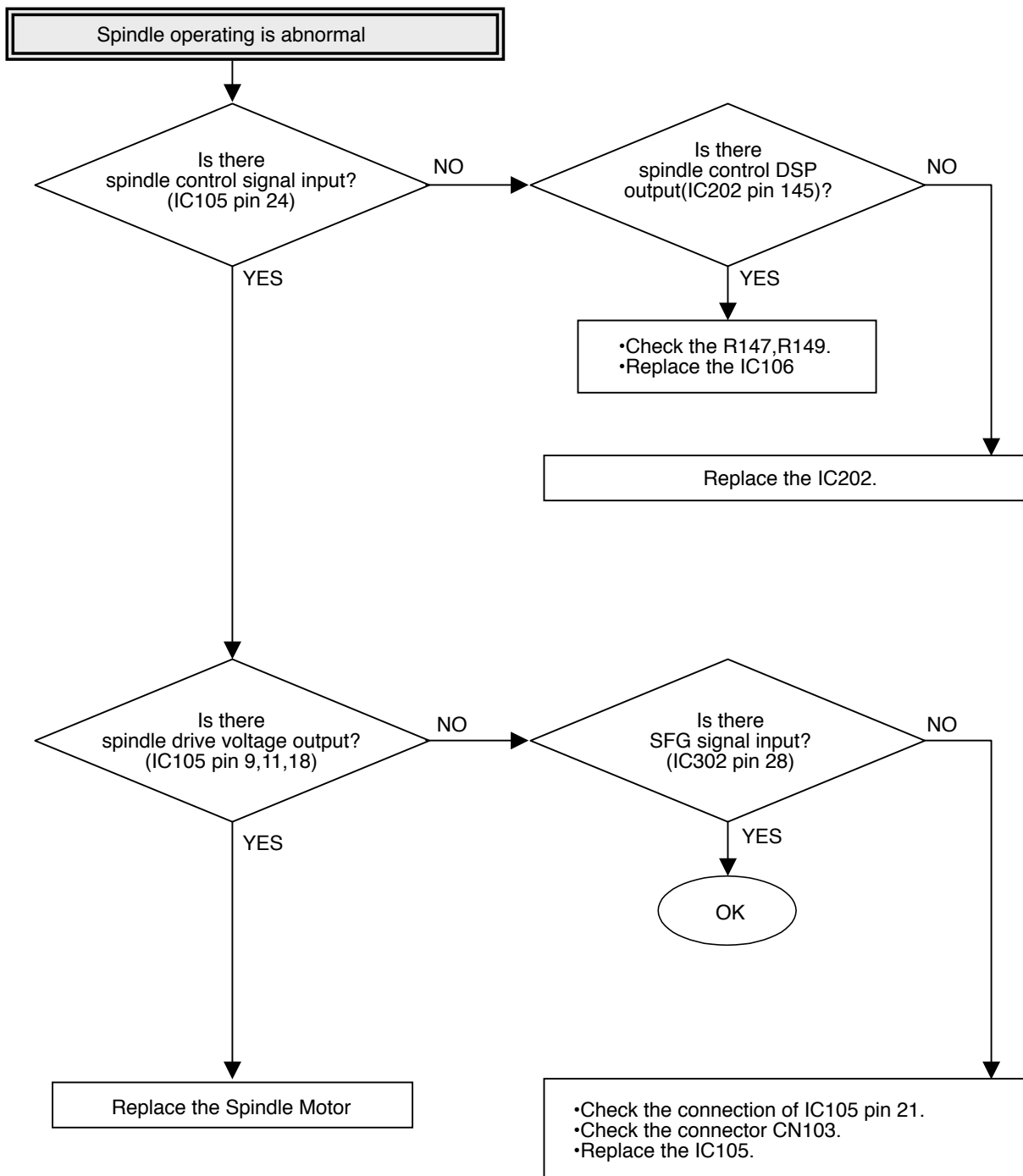
ELECTRICAL TROUBLESHOOTING GUIDE

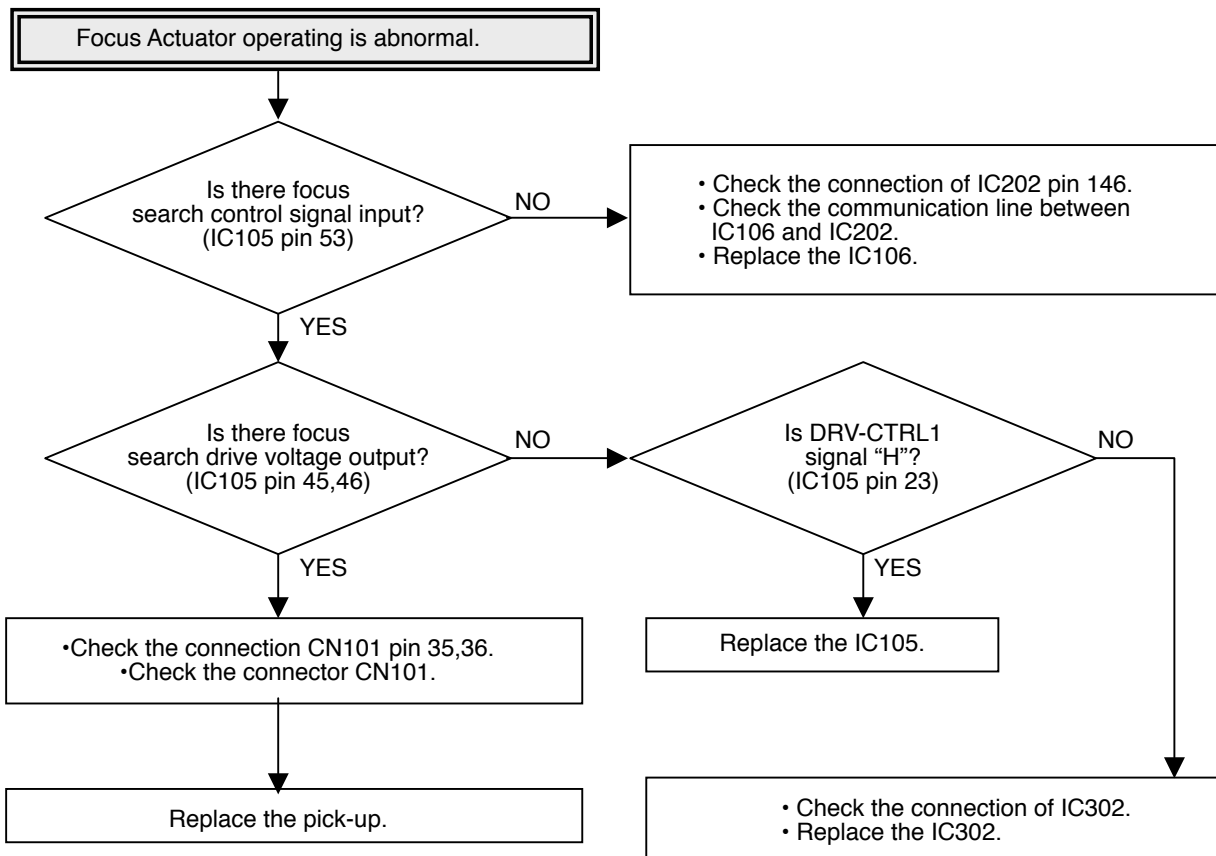
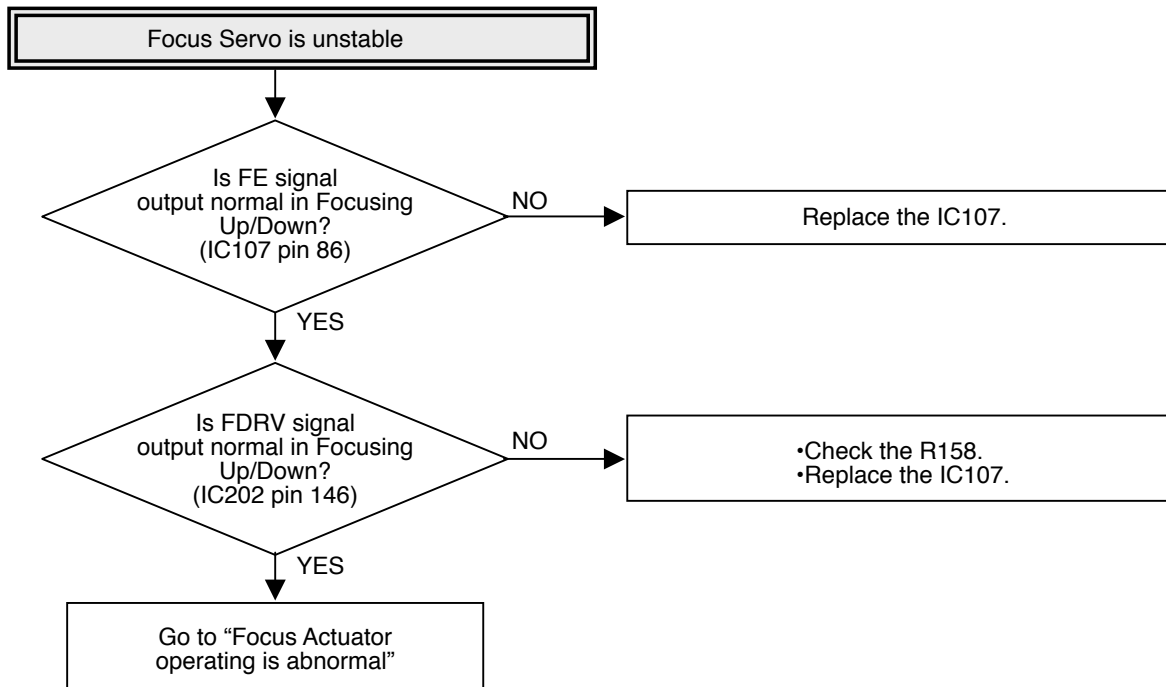


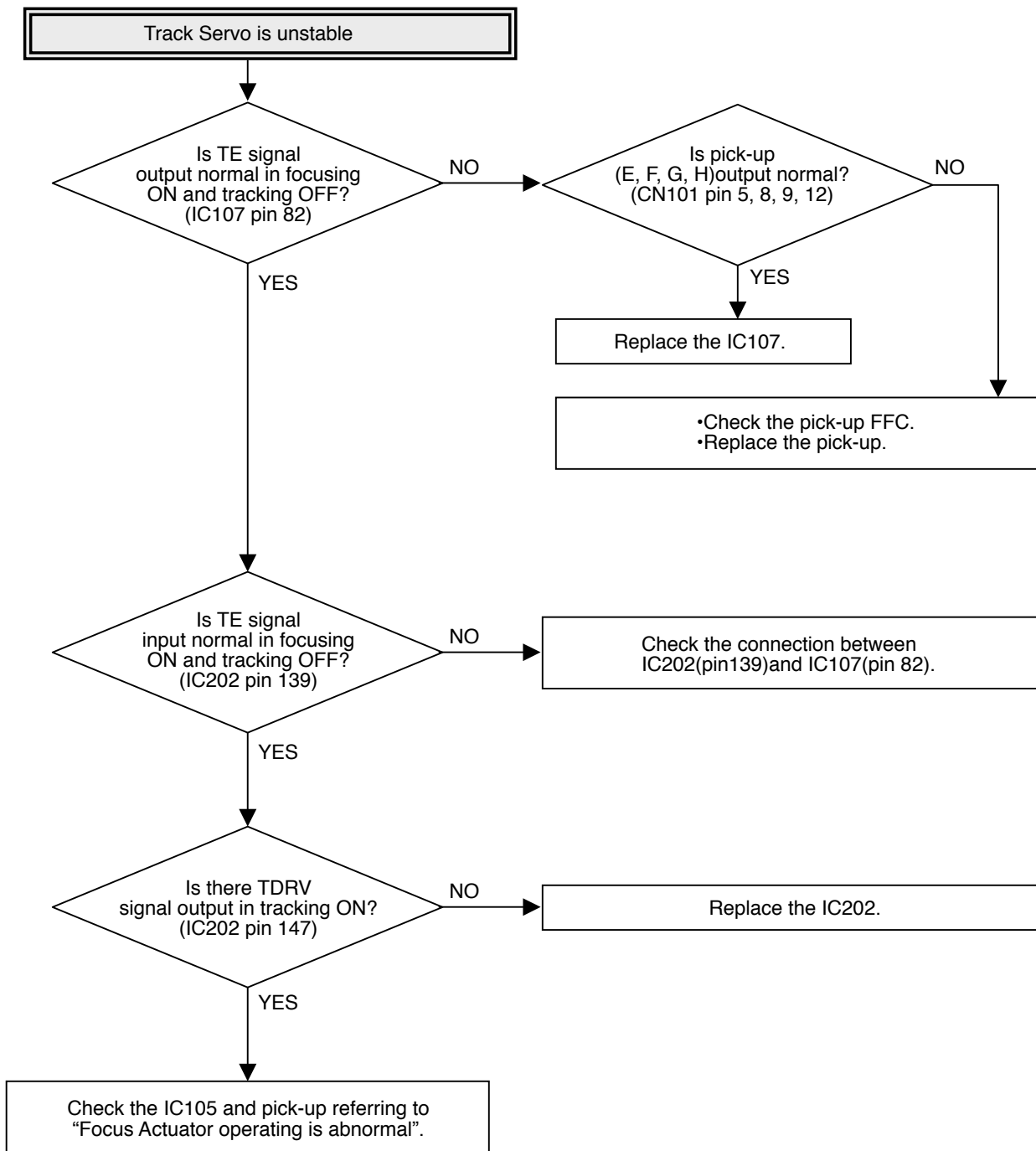


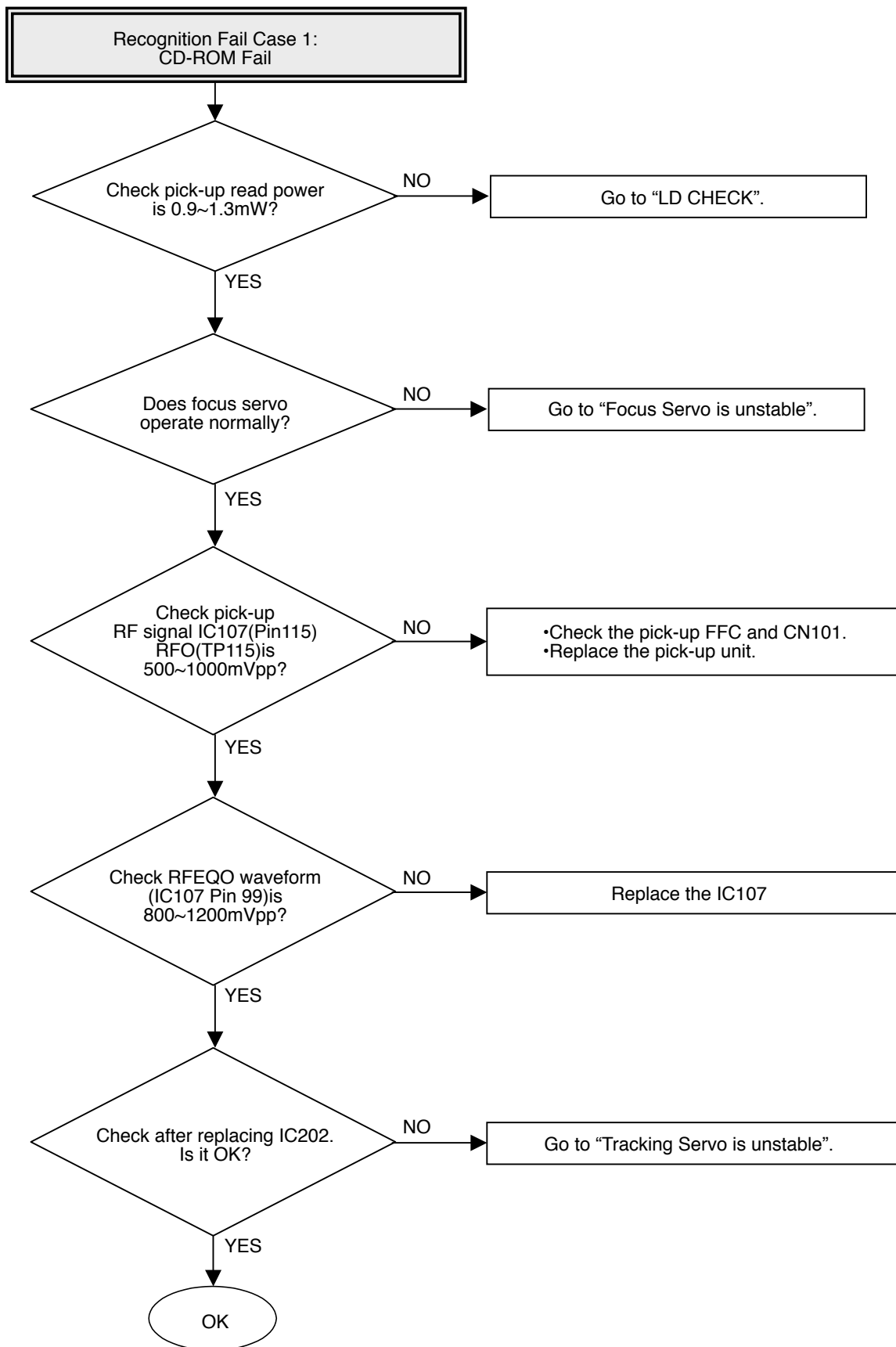


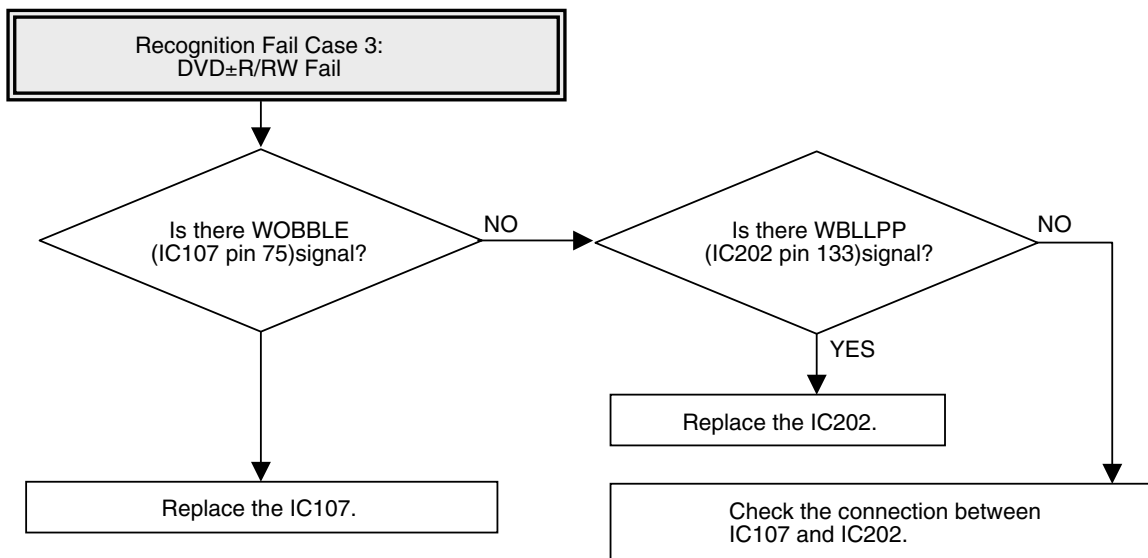
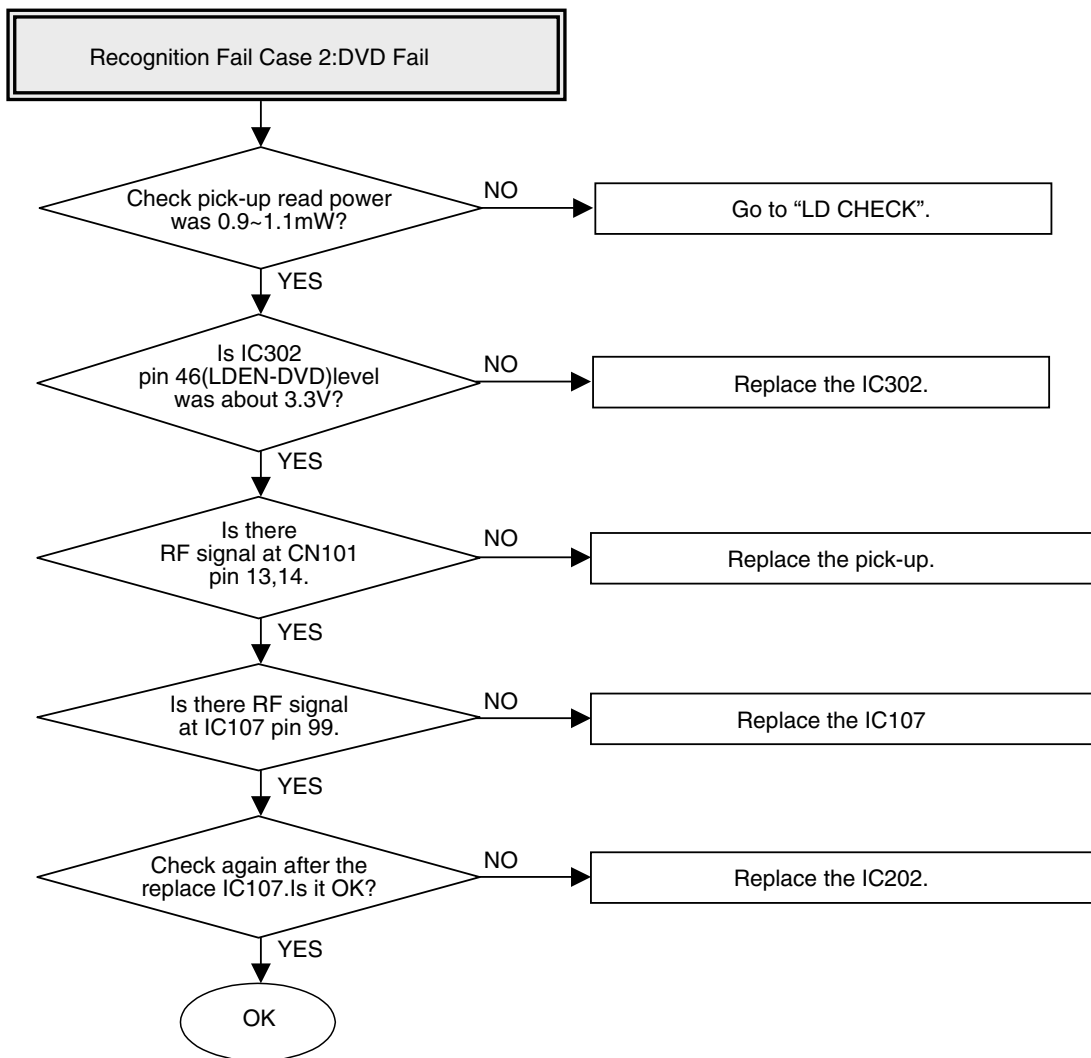


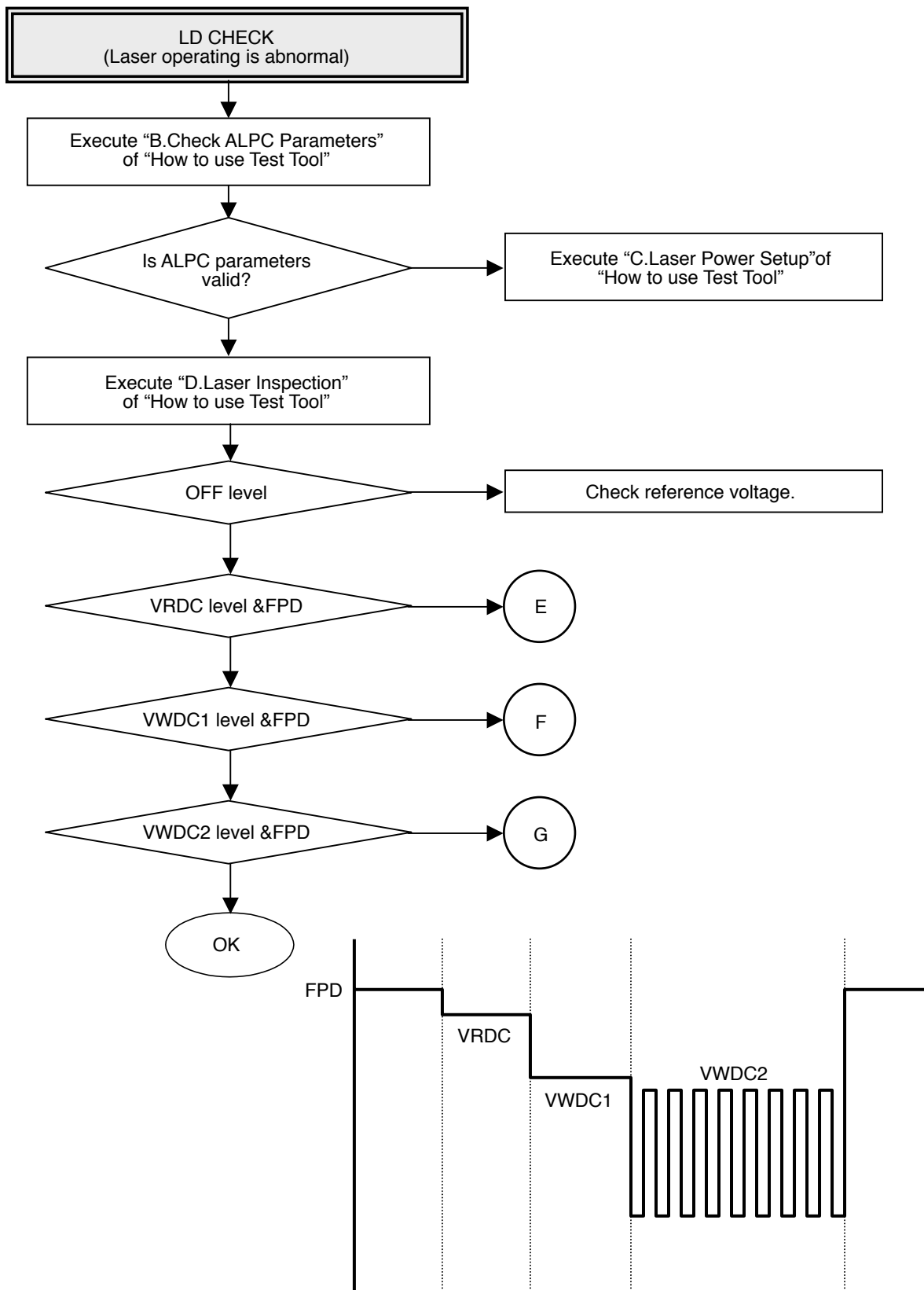


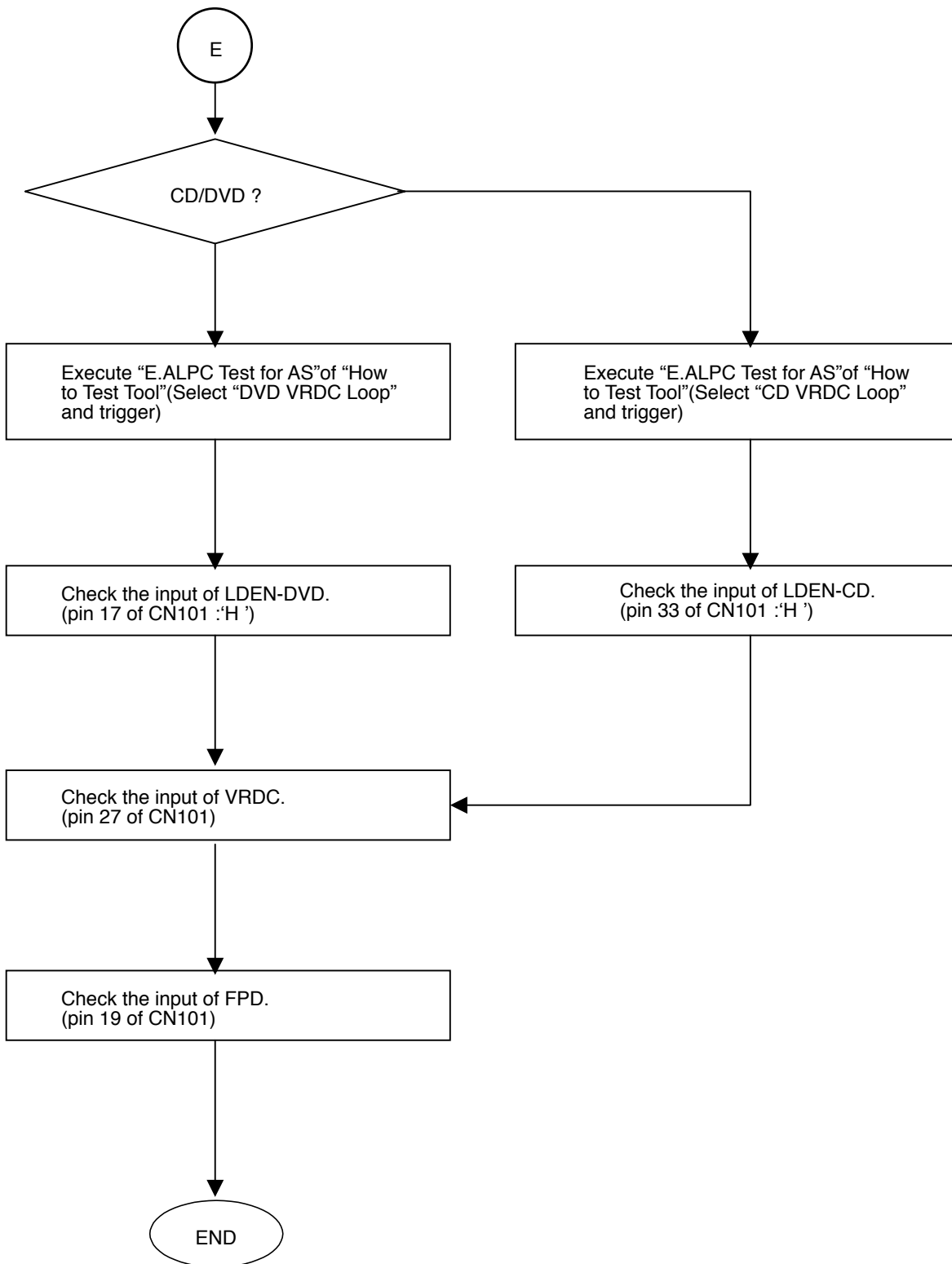


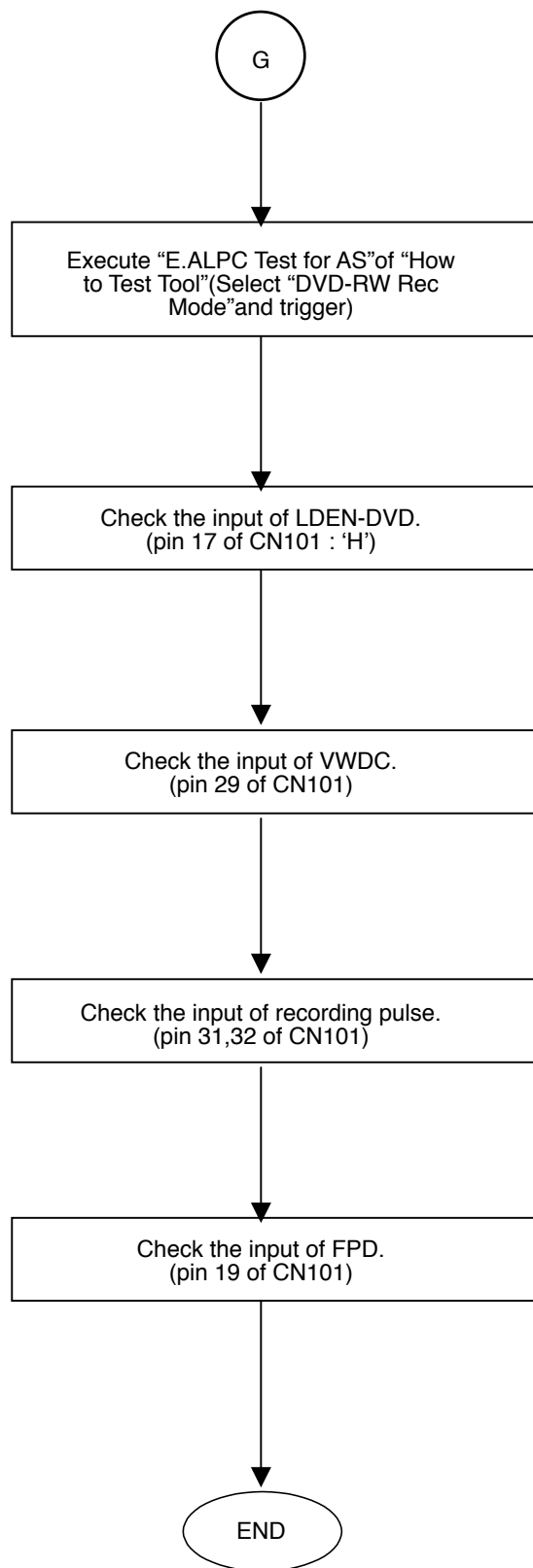
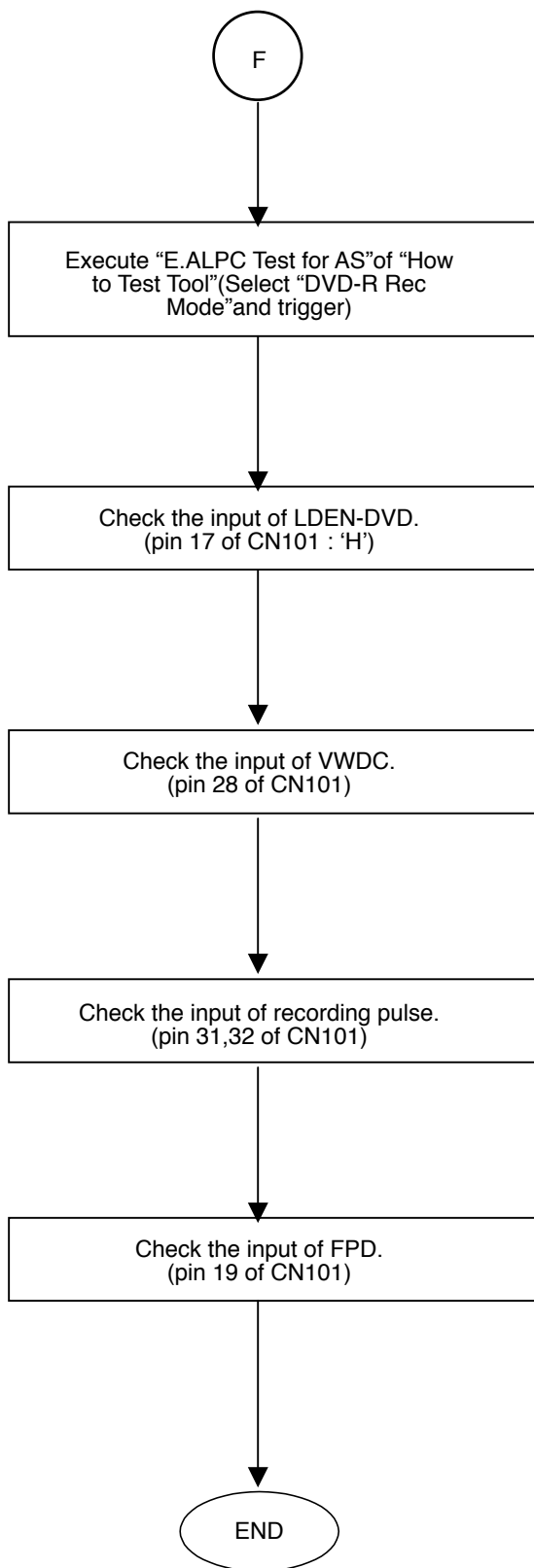


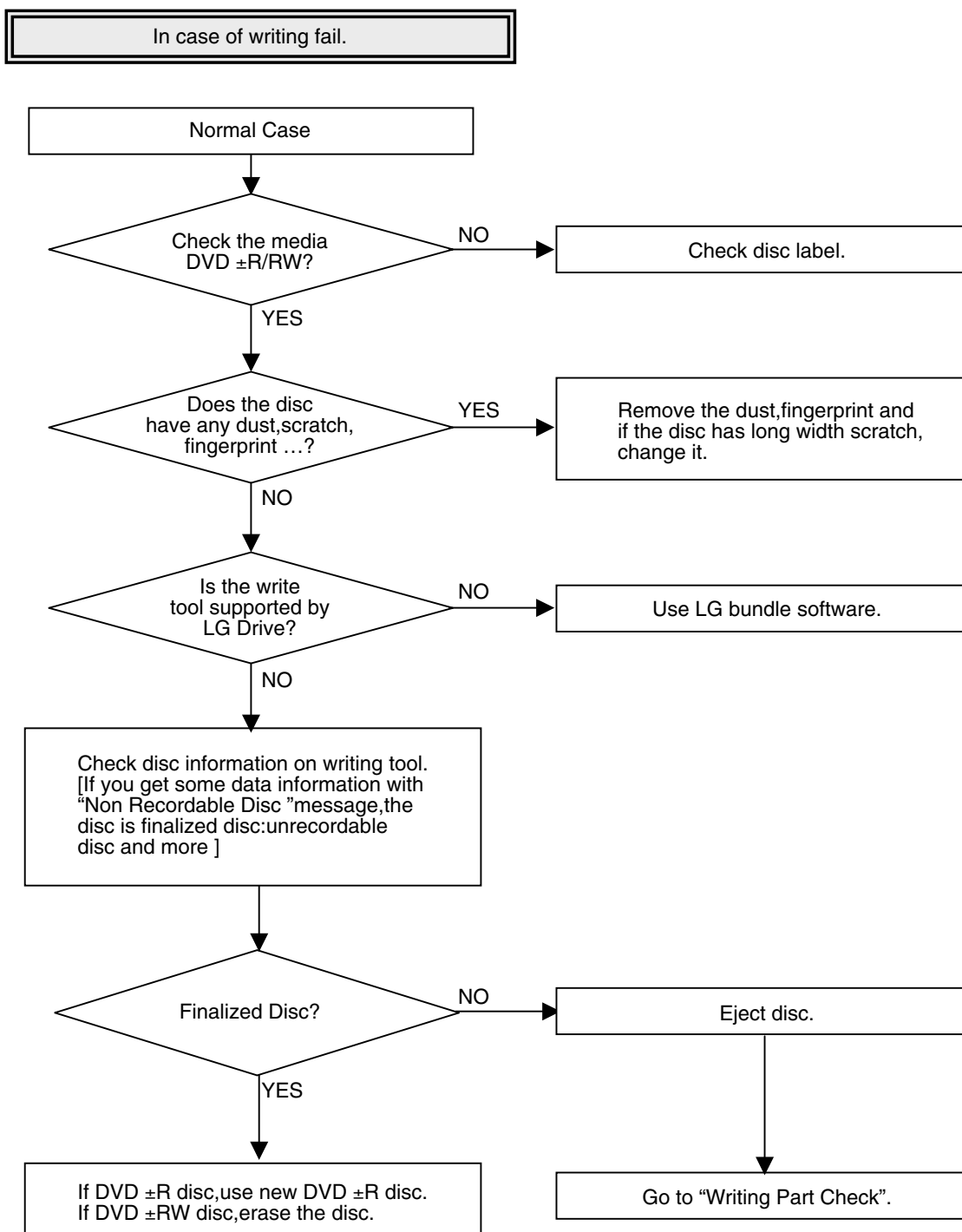


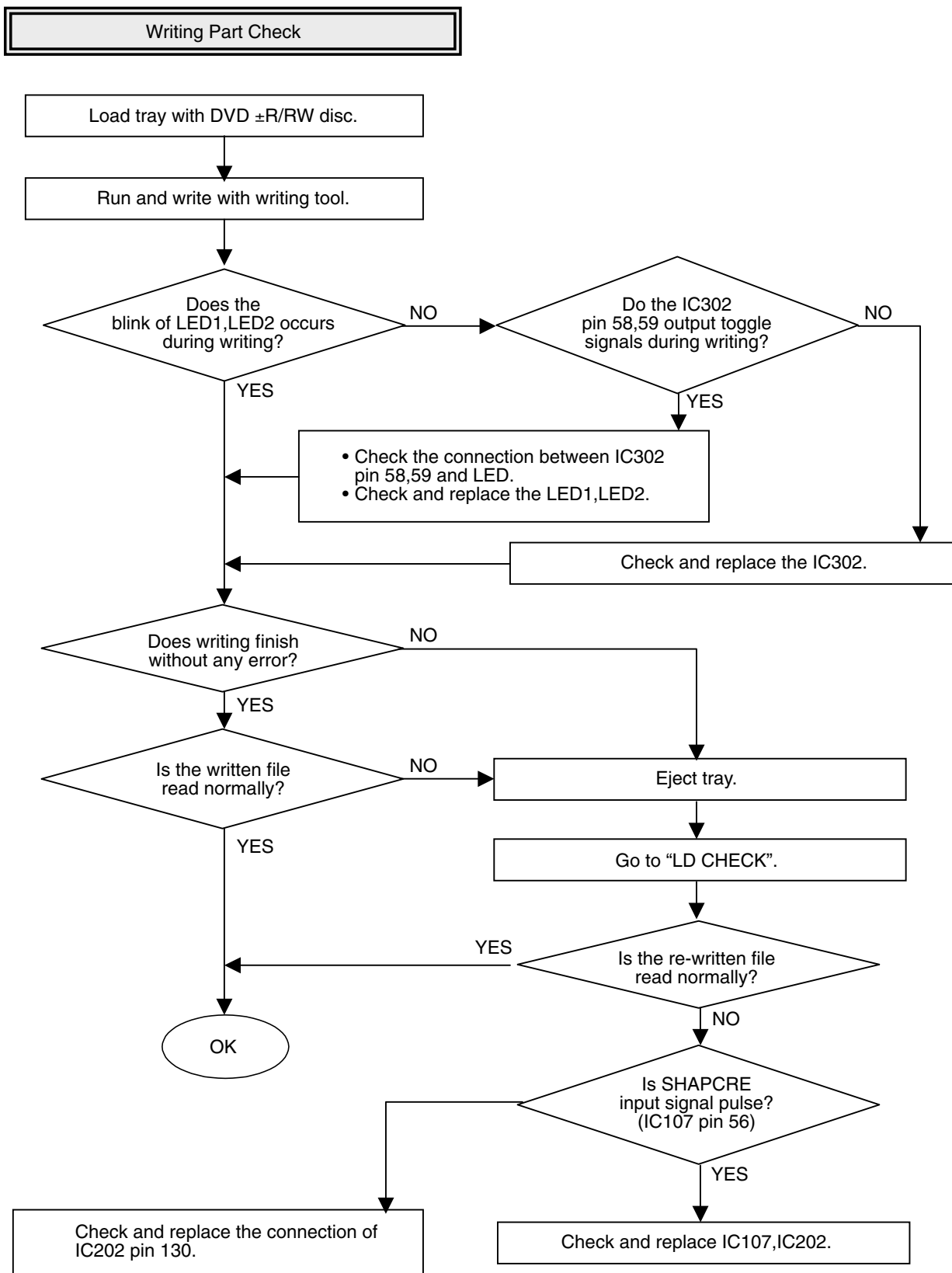












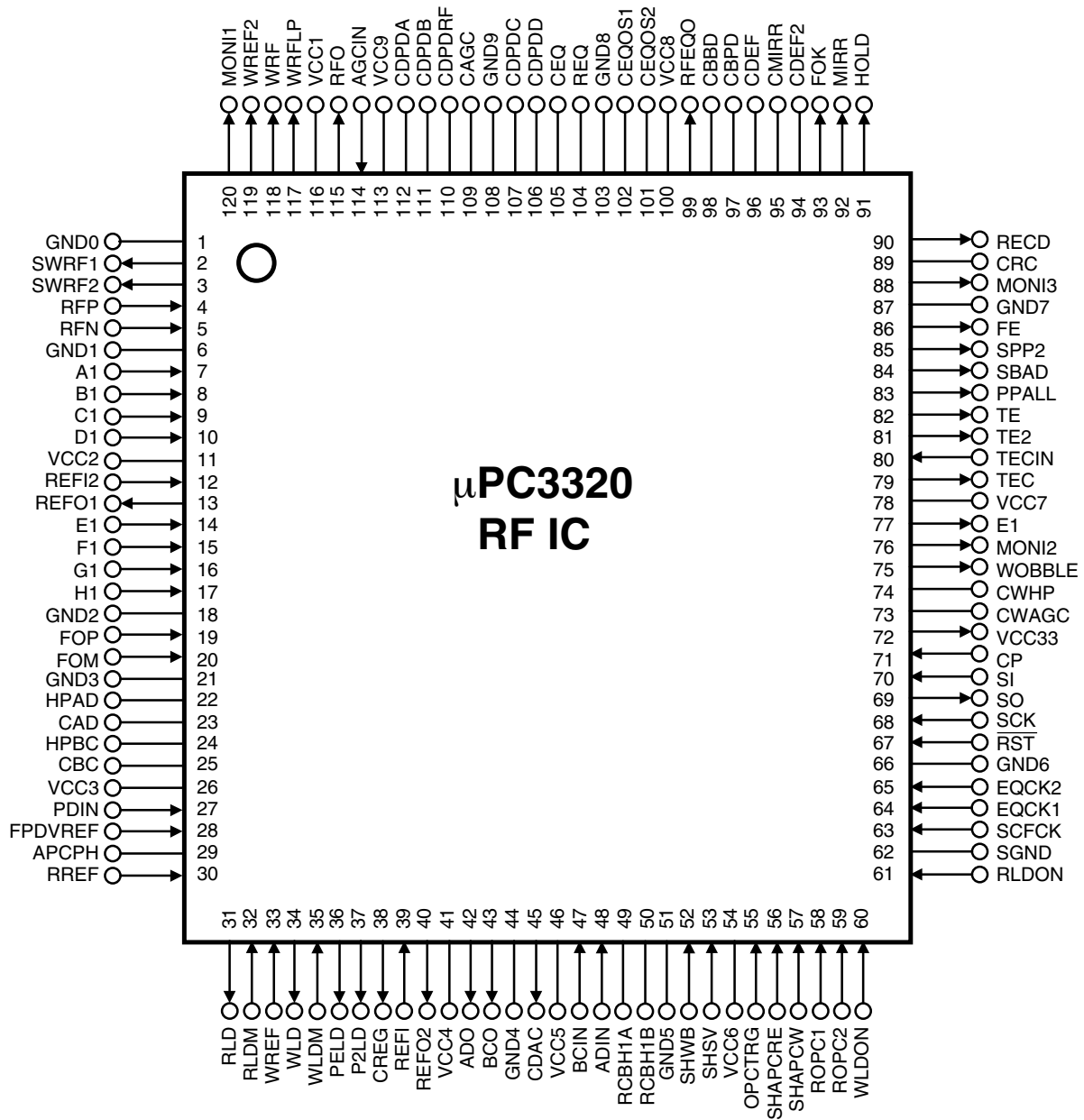
1. Overall Block Diagram



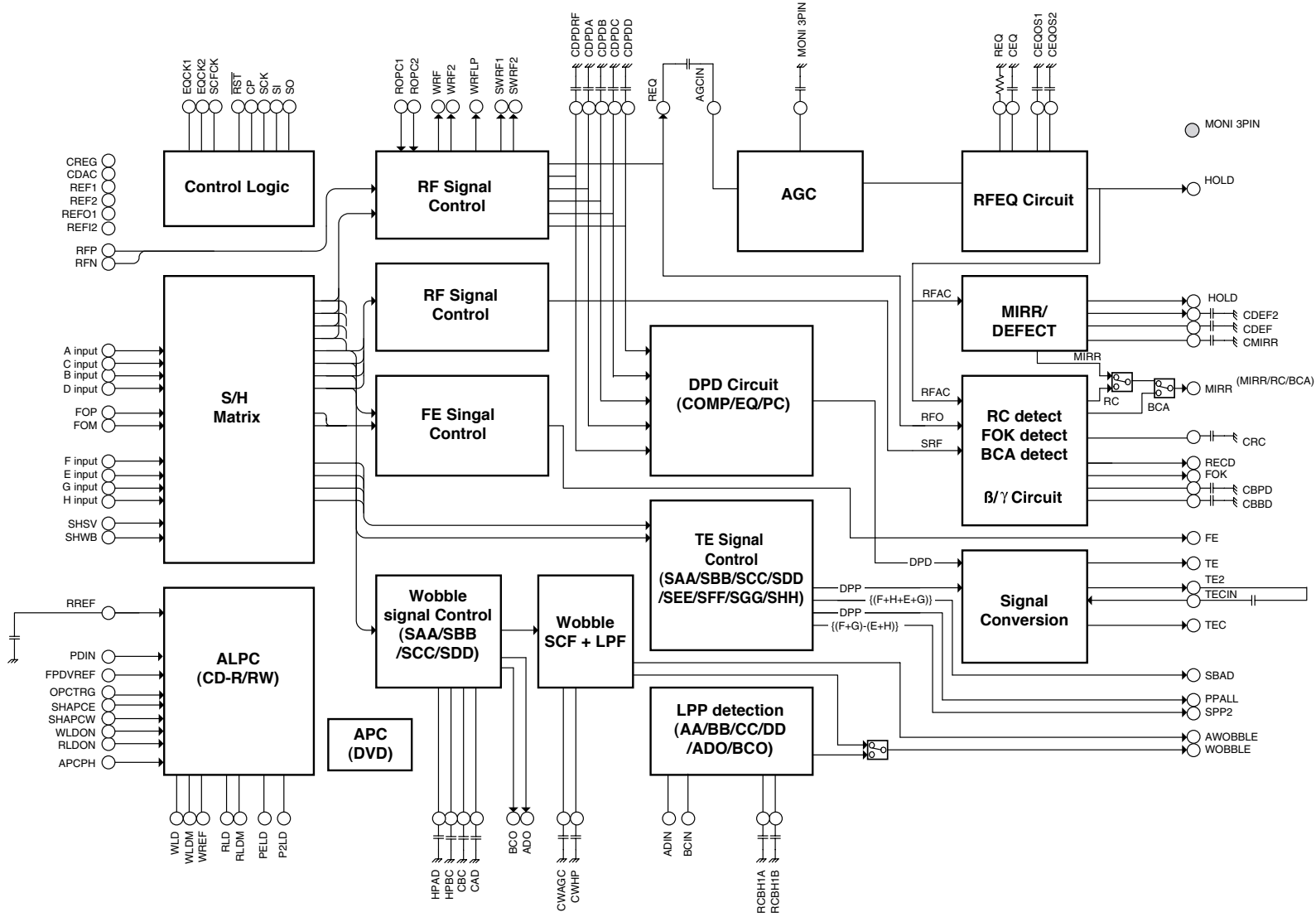
2. MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

IC101 (μ PC3320) : RF Signal Processor for CD/DVD

Pin Assignment



Block Diagram



Pin description

No.	Pin Name	Type	Description
1	GND0	-	Analog GND
2	SWRF1	OUTPUT	WRF signal sampling & hold [S/H] signal output.
3	SWRF1	OUTPUT	WRF signal sampling & hold [S/H] signal output.
4	RFP	INPUT	RF differerential signal[+] input.
5	RFN	INPUT	RF differerential signal[-] input.
6	GND1	-	Analog GND
7	A1	INPUT	Main beam signal [A1] input.
8	B1	INPUT	Main beam signal [B1] input.
9	C1	INPUT	Main beam signal [C1] input.
10	D1	INPUT	Main beam signal [D1] input.
11	VCC2	-	Analog power.
12	REFI2	INPUT	Reference voltage input pin for PDIC.
13	REFO1	OUTPUT	Pick-up internal reference voltage output[at REFI pin 2.5V: 2.25V output.]
14	E1	INPUT	Sub beam signal [E1] input.
15	F1	INPUT	Sub beam signal [F1] input.
16	G1	INPUT	Sub beam signal [G1] input.
17	H1	INPUT	Sub beam signal [H1] input.
18	GND2	-	Analog GND
19	FOP	INPUT	FO+ signal input for Focus.
20	FOM	INPUT	FO- signal input for Focus.
21	GND3	-	Analog GND
22	HPAD	-	Wobble circuit HPF band setting condenser connecting port.
23	CAD	-	Wobble circuit AGC response time setting condenser connecting port.
24	HPBC	-	Wobble circuit HPF band setting condenser connecting port.
25	CBC	-	Wobble circuit AGC response time setting condenser connecting port.
26	VCC3	-	Analog power.
27	PDIN	INPUT	Laser monitor current input.
28	FPDVREF	INPUT	Reference voltage input pin for front monitor.
29	APCPH	-	Peak-hold condenser connecting pin for ALPC .
30	RREF	-	Read ALPC Condenser connecting port.
31	RLD	OUTPUT	Read Laser drive control output.
32	RLDM	INPUT	Read Laser drive control Amp[-] input.
33	WREF	-	Write ALPC Condenser connecting port.
34	WLD	OUTPUT	Write Laser drive control output.
35	WLDM	INPUT	Write Laser drive control Amp[-] input.
36	PELD	OUTPUT	Pick power output port1.
37	P2LD	OUTPUT	Pick power output port 2.
38	CREG	OUTPUT	Regulater voltage[2.5V] output.
39	REF1	INPUT	DSP power voltage input[2.5V].
40	REFO2	OUOTPTU	DSP Reference voltage output [at REFI port 2.5V: 1.5V output].

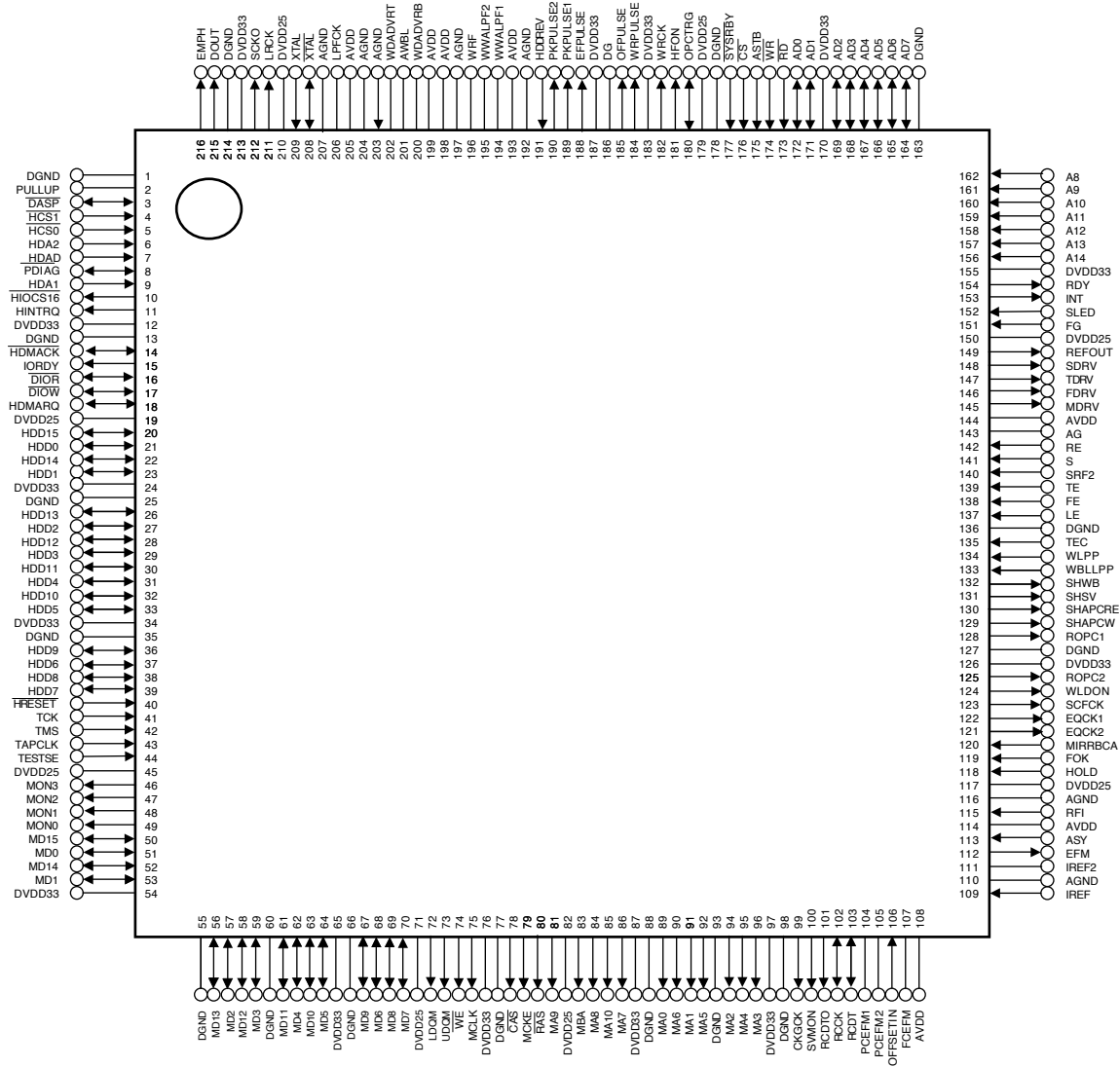
No.	Pin Name	Type	Description
41	VCC4	-	Analog power.
42	ADO	OUTPUT	Wobble circuit [A+D] signal output.
43	BCO	OUTPUT	Wobble circuit [B+C] signal output.
44	GND4	-	Analog GND
45	CDAC	OUTPUT	DAC reference voltage output.
46	VCC5	-	Digital power.
47	BCIN	INPUT	[B+C] signal input.
48	ADIN	INPUT	[A+D] signal input.
49	RCBH1A	-	RLPP circuit bottom hold condenser connecting port.
50	RCBH1B	-	RLPP circuit bottom hold condenser connecting port.
51	GND5	-	Analog GND
52	SHWB	INPUT	Sample hold pulse input for Wobble signal.
53	SHSV	INPUT	Sample hold pulse input for Servo signal.
54	VCC6	-	Digital power.
55	OPCTRG	INPUT	OPCTRG signal input.
56	SHAPCRE	INPUT	Sample hold pulse input for Read/Erase ALPC.
57	SHPCW	INPUT	Sample hold pulse input for Write ALPC.
58	ROPC1	INPUT	Sample hold pulse input 1 for WRF signal.
59	ROPC2	INPUT	Sample hold pulse input 2 for WRF signal.
60	WLDON	INPUT	Write ALPC Center signal input.
61	RLDON	INPUT	Read ALPC Center signal input.
62	SGND	-	Sub straight GND.
63	SCFCK	INPUT	SCF clock input.
64	EQCK1	INPUT	Fixed clock input.
65	EQCK2	INPUT	Equalize automatic control clock input.
66	GND6	-	Analog GND
67	RST	INPUT	Register reset input.
68	SCK	INPUT	Register setting clock input.
69	SO	OUTPUT	Serial data output.
70	SI	INPUT	Serial data input.
71	CP	INPUT	Address
72	VCC33	OUTPUT	Power voltage [3.3V monitor].
73	CWAGC	-	Wobble circuit AGC response time setting condenser connecting port.
74	CWHP	-	Wobble circuit HPF band setting condenser connecting port.
75	WOBBLE	OUTPUT	Wobble signal output [Digital signal].
76	AWOBBLE	OUTPUT	Wobble signal output [Analog signal].
77	MONI2	OUTPUT	Internal signal monitor port.
78	VCC7	-	Digital power.
79	TEC	OUTPUT	Tracking zero cross signal output.
80	TECIN	INPUT	Tracking zero cross signal input.

No.	Pin Name	Type	Description
81	TE2	OUTPUT	Tracking error signal output.
82	TE	OUTPUT	Tracking error signal output for Servo.
83	PPALL	OUTPUT	Main side push-pull signal output.
84	SBAD	OUTPUT	Sub beam signal output [(E+F+G+H) signal].
85	SPP2		Sub beam signal output [(F+G)-(E+H) signal].
86	FE	OUTPUT	Focus error signal.
87	GND7	-	Analog GND
88	MONI3	OUTPUT	Internal signal monitor port.
89	CRC	-	Radial contrast circuit condenser connecting port.
90	RECD	OUTPUT	No recording area detection.
91	HOLD	OUTPUT	Detection signal output.
92	MIRR	OUTPUT	Mirror detection/RCA signal output.
93	FOK	OUTPUT	Focus OK signal.
94	CDEF2	-	Detect circuit condenser connecting port 2.
95	CMIRR	-	Mirror circuit condenser connecting port.
96	CDEF	-	Detect circuit condenser connecting port .
97	CBPD	-	β , γ adetection[peak]condenser connecting port.
98	CBBB	-	β , γ adetection[buttom]condenser connecting port.
99	RFEQO	OUTPUT	Equalizer output.
100	VCC8	-	Analog power.
101	CEQOS2	-	RF Equalizer circuit condenser connecting port 2.
102	CEQOS1	-	RF Equalizer circuit condenser connecting port 1.
103	GND8	-	Analog GND
104	REQ	-	RF Equalizer circuit volatage setting resistance connecting port.
105	CEQ	-	Equalizer fc automatic control curcuit condenser connecting port.
106	CDPDD	-	DPD [D signal] HPF band setting condenser connecting port.
107	CDPDC	-	DPD [C signal] HPF band setting condenser connecting port.
108	GND9	-	Analog GND
109	CDPDC	-	RFAGC circuit condenser connecting port.
110	CDPDRF	-	DPD [RF signal] HPF band setting condenser connecting port.
111	CDPDRF	-	DPD [B signal] HPF band setting condenser connecting port.
112	CDPDA	-	DPD [A signal] HPF band setting condenser connecting port.
113	VCC9	-	Analog power.
114	AGCIN	INPTU	AGC input
115	RFO	OUTPUT	Read RF signal output.
116	VCC1	-	Analog power.
117	WRFLP	OUTPUT	Write RF LPF output.
118	WRF	OUTPUT	Write RF signal output.
119	WFR2	OUTPUT	Write RF2 signal output.
120	MONI1	OUTPUT	Internal signal monitor port.

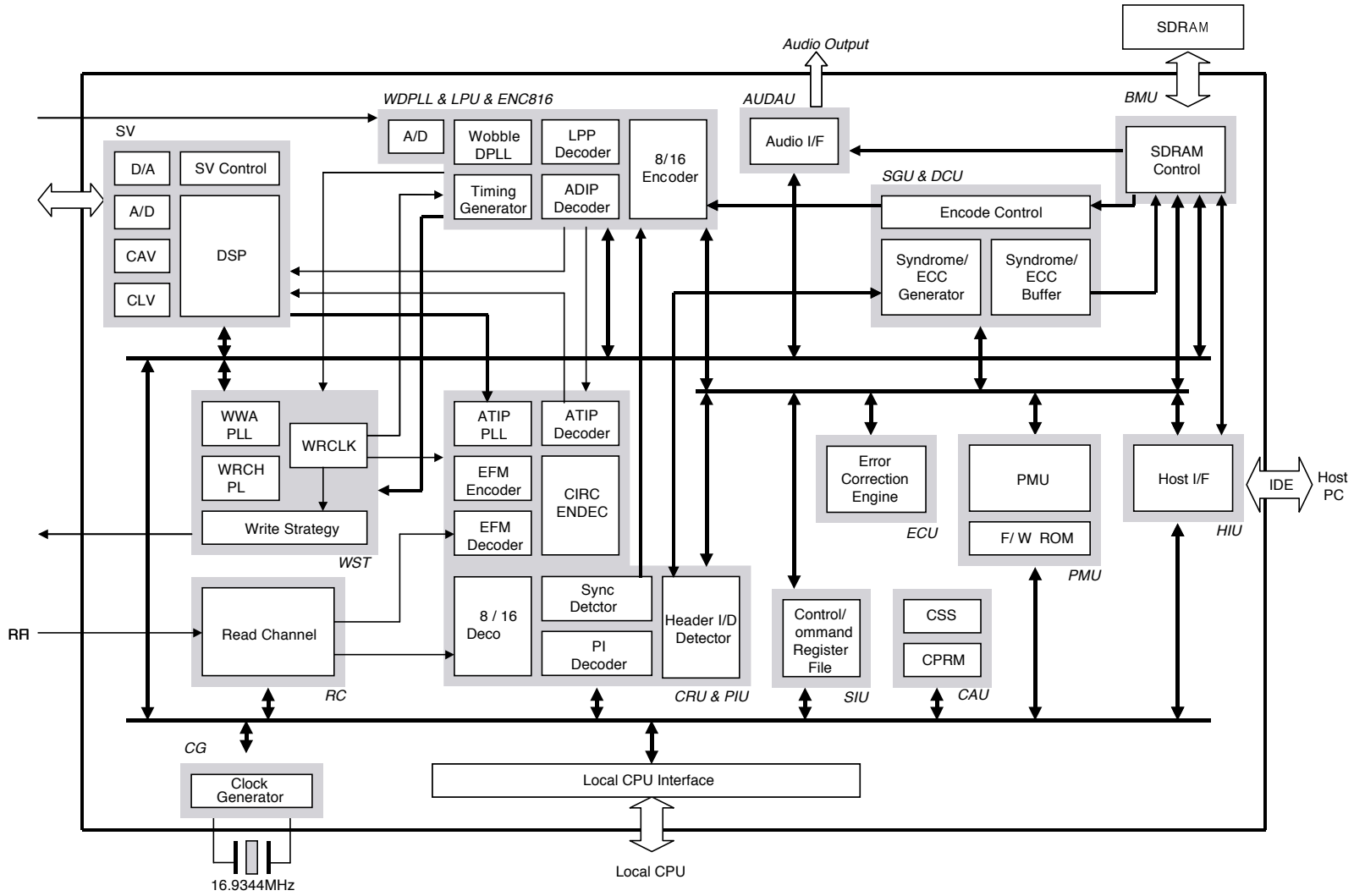
3. MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

IC201(μ PD63620) : Encoder, Decoder & DSP Signal Processor

Pin Assignment



Block Diagram



Pin description

Pin No.	Pin Name		Type		Description
1	DGND	-	-	-	Digital GND
2	PULLUP	-	-	-	Pull-up resistance connecting port.[5V or 3.3V]
3	$\overline{\text{DASO}}$	5V_tolerant	I/O	Pull-up	Drive active slave presesnt signal.[open/drain]
4	$\overline{\text{HCS1}}$	5V_tolerant	I	-	Host interface chip, pull-up selection input.
5	$\overline{\text{HCS0}}$	5V_tolerant	I	-	Host interface chip, pull-up selection input.
6	HDA2	5V_tolerant	I	-	Host interface chip, address signal input.
7	HDAO	5V_tolerant	I	-	Host interface chip, address signal input.
8	$\overline{\text{PDIAG}}$	5V_tolerant	I/O	Pull-up	Diagnostic signal [open/drain]
9	HDA1	5V_tolerant	I	-	Host interface chip, address signal input.
10	$\overline{\text{HIOCS16}}$	5V_tolerant	I	Pull-up	16 bit I/O signal [open/drain]. When Ultra DMA burst, this is 3 state port.
11	HINTRQ	5V_tolerant	O	Pull-up	Host interrupt signal output.
12	DVDD33	-	-	-	Digital power[3.3V]
13	DGND	-	-	-	Digital GND
14	$\overline{\text{HDMACK}}$	5V_tolerant	I/O	-	DMA acknowledge signal.
15	IORDY	5V_tolerant	I	Pull-up	I/O Channel ready[open/drain]. When Ultra DMA burst, this is DDMARDY: DSTROBE signal.
16	$\overline{\text{DIOR}}$	5V_tolerant	I/O	-	Host interface read input signal. When Ultra DMA burst, this is HDMARDY: HSTROBE signal.
17	$\overline{\text{DIOW}}$	5V_tolerant	I/O	-	Host interface write input signal. When Ultra DMA burst, this is STOP signal.
18	HDMARQ	5V_tolerant	O	Pull-up	DMA request signal output.
19	DVDD25	-	-	-	Digital power[2.5V]
20	HDD15 HDD8	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
21	HDD0 HDD6	5V_tolerant	O	Pull-up	Host interface data bus.[within slave resistance]
22	HDD14 HDD9	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
23	HDD1	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
24	DVDD33	-	-	-	Digital power[3.3V]
25	DGND	-	-	-	Digital GND
26	HDD13 HDD10	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
27	HDD2 HDD4	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]

Pin No.	Pin Name		Type		Description
28	DGND HDD4	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance
29	HDD3 HDD3	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
30	HDD11 HDD12	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
31	HDD4 HDD2	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance
32	HDD7 HDD13	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
33	HDD7 HDD1	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
34	DVDD33	-	-	-	Digital power[3.3V]
35	DGND	-	-	-	Digital GND
36	HDD9 HDD14	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
37	HDD6 HDD0	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
38	HDD8 HDD15	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
39	HDD7	5V_tolerant	I/O	Pull-up	Host interface data bus.
40	HRESET	5V_tolerant	I/O	-	Host reset input.
41	TCK	3V	I	-	Test port. It must be connected to DGND.
42	TMS	3V	I	-	Test port. It must be connected to DGND.
43	TAPCLK	3V	I	-	Test port. It must be connected to DGND.
44	TESTSE	3V	I	-	Test port. It must be connected to DGND.
45	DVDD25	-	-	-	Digital power[2.5V]
46	MON3	3V	O	L	Monitor: test signal.
47	MON2	3V	O	L	Monitor: test signal.
48	MON1	3V	I/O	L	Monitor: test signal.
49	MON0	3V	I/O	L	Monitor: test signal.
50	MD15	3V	I/O	Pull-up	Buffer memory , Interface data bus.
51	MD0	3V	I/O	Pull-up	Buffer memory , Interface data bus.
52	MD14	3V	I/O	Pull-up	Buffer memory , Interface data bus.
53	MD1	3V	I/O	Pull-up	Buffer memory , Interface data bus.
54	DVDD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)

Pin No.	Pin Name		Type		Description
55	DGND	-	-	-	Digital GND.(Buffer. Memory. Block)
56	MD13	3V	I/O	Pull-up	Buffer memory , Interface data bus.
57	MD2	3V	I/O	Pull-up	Buffer memory , Interface data bus.
58	MD12	3V	I/O	Pull-up	Buffer memory , Interface data bus.
59	MD3	3V	I/O	Pull-up	Buffer memory , Interface data bus.
60	DGND	-	-	-	Digital GND.
61	MD11	3V	I/O	Pull-up	Buffer memory , Interface data bus.
62	MD4	3V	I/O	Pull-up	Buffer memory , Interface data bus.
63	MD10	3V	I/O	Pull-up	Buffer memory , Interface data bus.
64	MD5	3V	I/O	Pull-up	Buffer memory , Interface data bus.
65	DVDD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)
66	DGND	-	-	-	Digital GND.(Buffer. Memory. Block)
67	MD9	3V	I/O	Pull-up	Buffer memory , Interface data bus.
68	MD6	3V	I/O	Pull-up	Buffer memory , Interface data bus.
69	MD8	3V	I/O	Pull-up	Buffer memory , Interface data bus.
70	MD7	3V	I/O	Pull-up	Buffer memory , Interface data bus.
71	DVDD25	-	-	-	Digital power.[2.5V]
72	LDQM	3V	O	H	Low byte, data input/output mask control signal.
73	UDQM	3V	O	H	High byte, data input/output mask control signal.
74	WE	3V	O	H	Buffer memory , Interface write enable signal.
75	MCLK	3V	O	Pull-up	SDRAM clock output.
76	DVDD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)
77	DGND	-	-	-	Digital GND.(Buffer. Memory. Block)
78	$\overline{\text{CAS}}$	3V	O	H	Buffer memory , Interface column address strobe control signal.
79	MCKE	3V	O	H	SDRAM clock enable control signal.
80	$\overline{\text{RAS}}$	3V	O	H	Buffer memory , Interface row address strobe control signal.
81	MA9	3V	O	L	Buffer memory , Interface address bus.
82	DVDD25	-	-	-	Digital power.[2.5V]
83	MBA	3V	O	L	Buffer memory , Interface bank address signal.
84	MA8	3V	O	L	Buffer memory , Interface data bus.
85	MA10	3V	O	L	Buffer memory , Interface data bus.
86	MA7	3V	O	L	Buffer memory , Interface data bus.
87	DVDD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)

Pin No.	Pin Name		Type		Description
88	DGND	-	-	-	Buffer memory , Interface data bus.
89	MA0	3V	O	H	Buffer memory , Interface data bus.
90	MA6	3V	O	L	Buffer memory , Interface data bus.
91	MA1	3V	O	L	Buffer memory , Interface data bus.
92	MA5	3V	O	L	Buffer memory , Interface data bus.
93	DGND	-	-	-	Digital GND
94	MA2	3V	O	L	Buffer memory , Interface data bus
95	MA4	3V	O	L	Buffer memory , Interface data bus.
96	MA3	3V	O	L	Buffer memory , Interface data bus.
97	DVDD3	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)
98	DGND	-	-	-	Digital GND (Buffer. Memory. Block)
99	CKGCK	3V	O		Clock, Generator output.
100	SVMON	3V	O	L	Servo, block monitor signal output.
101	RCDTO	3V	O	L	Read channel data output.
102	RCCK	3V	I/O	Hi-Z	Read channel clock output.
103	RCDT	3V	I/O	Hi-Z	Read channel data output.
104	PCEFM1	Analog	-	-	Read channel phase discriminator condenser connecting port.
105	PCEFM2	Analog	-	-	Read channel phase discriminator condenser connecting port.
106	OFFSETIN	Analog	-	-	Read channel phase discriminator charge pump control port.
107	FCEFM	Analog	-	-	Read channel frequency discriminator condenser connecting port.
108	AVDD	-	-	-	Analog power[2.5V]
109	IREF	Analog	o	-	Read channel analog reference voltage input.
110	AGND	-	-	-	Analog GND[EFM PLL]
111	IREF2	Analog	O	-	Non connecting port.
112	EFM	Analog	O	Pull-up	EFM comparator output.
113	ASY	Analog	O	-	EFM comparator asymmetry control voltage input.
114	AVDD	-	-	-	Analog power[2.5V]
115	RFI	Analog	O		EFM comparator RF signal input.
116	AGND	-	-	-	Analog GND[EFM]
117	DVDD25	-	-	-	Digital power.[2.5V]
118	HOLD	3v	O	-	HOLD control signal input.
119	FOK	3v	O	-	FOK signal input.
120	MIRRBCA	3V	O	-	Mirror signal or BCA signal input.

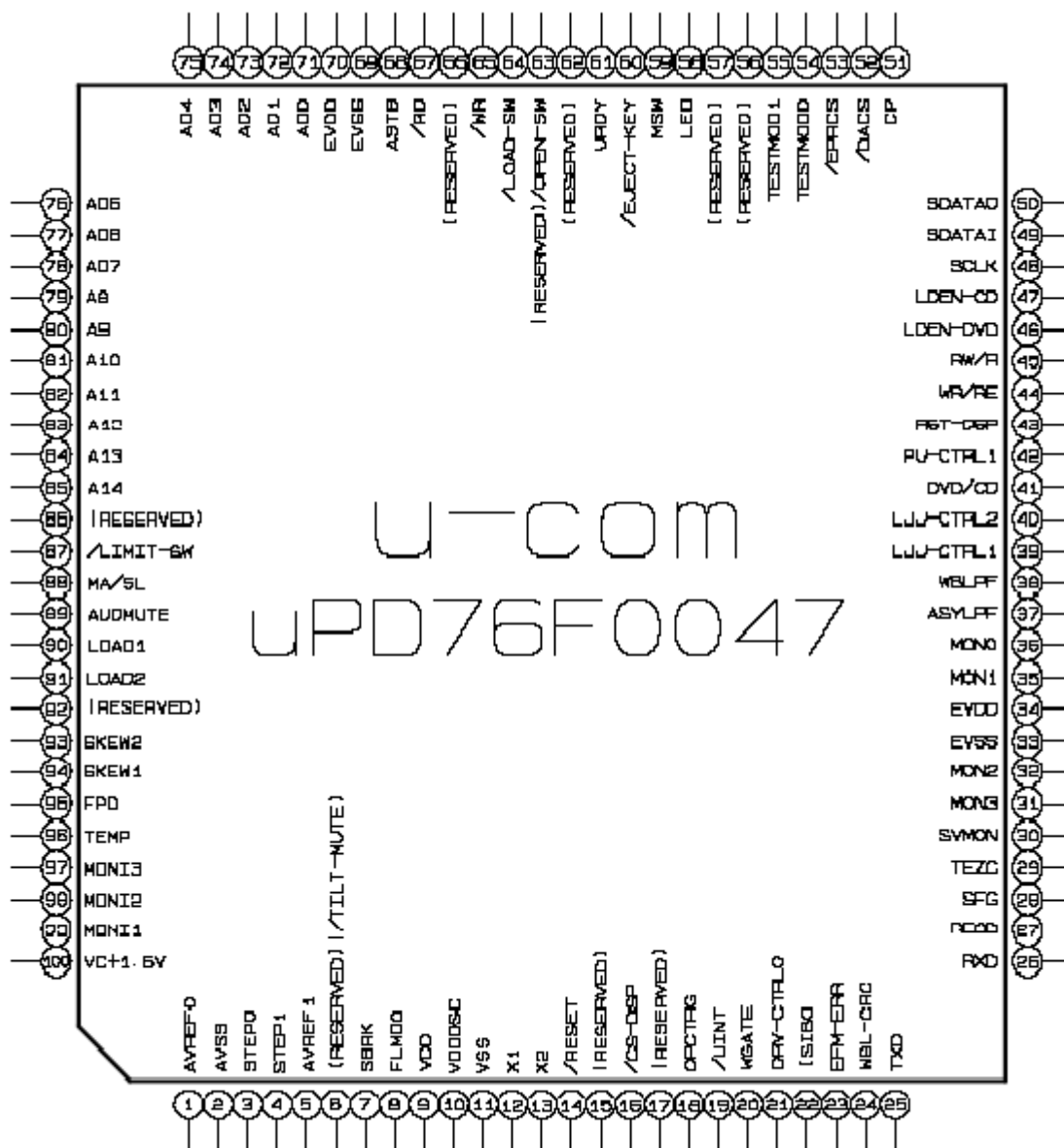
Pin No.	Pin Name		Type		Description
121	MIRRBCA	3V	O	Pull-up	RF AMP PC3320 RF equalizer automatic follow-up clock output.
122	EQCK1	3V	O	Pull-up	RF AMP PC3320 RF equalizer fixed clock output.
123	SCFCK	3V	O	P	RF AMP PC3320 RF equalizer automatic follow-up clock output.
124	WLDON	3V	O	L	Laser, Driver write laser control signal.
125	ROPC2	3V	O	L	Running OPC,sample hold signal.
126	DVDD33	-	-	-	Digital power.[3.3V]
127	DGND	-	-	-	Digital GND
128	ROPC1	3V	O	L	Running OPC,sample hold signal.
129	ROPC1	3V	O	L	APC write, sample hold signal.
130	SHAPCRE	3V	O	H	APC read/erase, sample hold signal.
131	SHSV	3V	O	H	Servo, sample hold signal.
132	SHWB	3V	O	H	Wobble, sample hold signal.
133	WBLPP	3V	I	-	CD: 2 direct Wobble signal input, DVD: RLPP signal input.
134	TEC	3V	I	-	Test port. It must be connected to DGND.
135	TEC	3V	I	-	Tracking, zero, cross signal input.
136	DGND	-	-	-	Digital GND
137	LE	Analog	I	-	Lens error signal input [A/D convertor].
138	FE	Analog	I	-	Focus error signal input [A/D convertor].
139	TE	Analog	I	-	Tracking error signal input [A/D convertor].
140	SWRF2	Analog	I	-	WRF sample hold signal input [A/D convertor].
141	SWRF1	Analog	i	-	WRF sample hold signal input [A/D convertor].
142	REFIN	Analog	I	-	Reference voltage input [A/D convertor].
143	AGND	-	-	-	Analog GND[Servo A/D, D/A block]
144	AVDD	-	-	-	Analog power 2.5V[Servo A/D, D/A block].
145	MDRV	Analog	O		Spindle drive output [D/A convertor output].
146	FDRV	Analog	O		Focus drive output [D/A convertor output].
147	TDRV	Analog	O		Trackng drive output [D/A convertor output].
148	SDRV	Analog	O		Sled drive output [D/A convertor output].
149	REFOUT	Analog	O	1/2AVDD	Reference voltage output.
150	DVDD25	-	-	-	Digital power[2.5V]
151	FG	5V_tolerant	I	-	FG signal input
152	SLED	5V_tolerant	O	-	Sled position sensor input.
153	INT	5V_tolerant	O	L	Interrupted request signal output to Local CPU

Pin No.	Pin Name		Type		Description
154	RDY	5V_tolerant	I	-	Access control signal output from Local CPU to SDRAM.
155	DVDD33	-	-	-	Digital power[3.3V]
156	A14	5V_tolerant	I	-	Local CPU Address bus.
157	A13	5V_tolerant	I	-	Local CPU Address bus.
158	A12	5V_tolerant	I	-	Local CPU Address bus.
159	A11	5V_tolerant	I	-	Local CPU Address bus.
160	A10	5V_tolerant	I	-	Local CPU Address bus.
161	A9	5V_tolerant	I	-	Local CPU Address bus.
162	A8	5V_tolerant	I	-	Local CPU Address bus.
163	DGND	-	-	-	Digital GND
164	AD7	5V_tolerant	I/O	-	Local CPU Address/data mux bus.
165	AD6	5V_tolerant	I/O	-	Local CPU Address/data mux bus.
166	AD5	5V_tolerant	I/O	-	Local CPU Address/data mux bus.
167	AD4	5V_tolerant	I/O	-	Local CPU Address/data mux bus.
168	AD3	5V_tolerant	I/O	-	Local CPU Address/data mux bus.
169	AD2	5V_tolerant	I/O	-	Local CPU Address/data mux bus.
170	DVDD33	-	-	-	Digital power[3.3V]
171	AD1	5V_tolerant	I/O	-	Local CPU Address/data mux bus.
172	AD0	5V_tolerant	I/O	-	Local CPU Address/data mux bus.
173	RD	5V_tolerant	I	-	Read strobe signal input.
174	WR	5V_tolerant	I	-	Write strobe signal input.
175	ASTB	5V_tolerant	I	-	Address strobe input.
176	$\overline{\text{CS}}$	5V_tolerant	I	-	Chip selector input from Local CPU.
177	$\overline{\text{SYSRST}}$	5V_tolerant	I	-	Reset input.
178	DGND	-	-	-	Digital GND.
179	DVDD25	-	-	-	Digital power[2.5V]
180	OPCTRG	3V	I/O	-	Wobble FM demodulation data output. DVD mode: OPCTRG signal output.
181	HFON	3V	O	H	Laser, Driver high-frequency control signal.
182	WRCK	-	-	L	Write Clock.
183	DVDD33	-	-	-	Digital power[3.3V]
184	WRPULSE	3V	O	L	Write pulse [write laser/driver control signal]
185	OFPULSE	3V	O	H	Write pulse [write laser/driver control signal]
186	DGND	-	-	-	Digital GND.

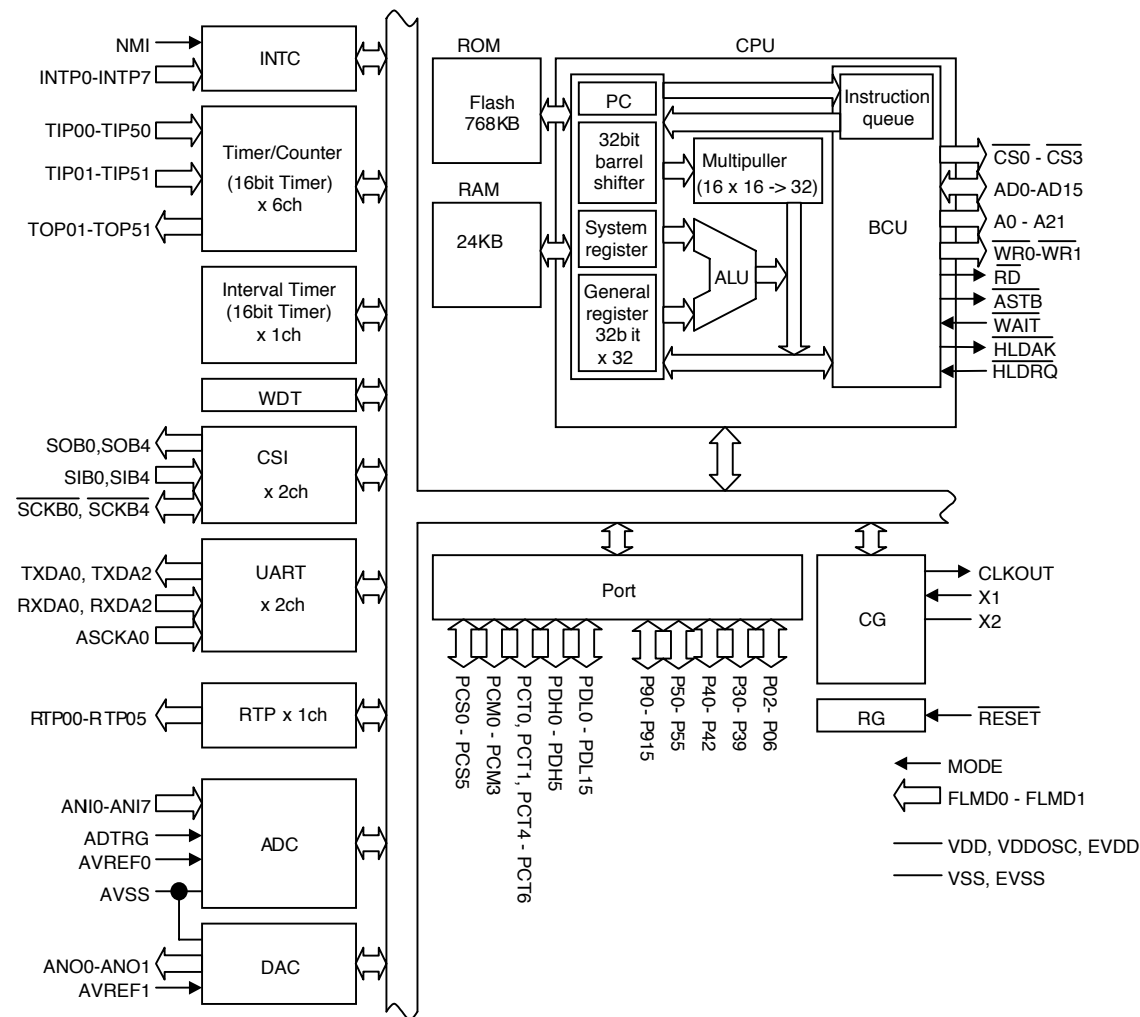
Pin No.	Pin Name		Type		Description
187	DVDD33	-	-	-	Digital power[3.3V]
188	EFPULSE	3V	O	L	OFF pluse output[write laser/driver control signal].
189	PKPULSE1	3V	O	L	Peak pluse output[write laser/driver control signal].
190	PKPULSE2	3V	O	L	Peak pluse output[write laser/driver control signal].
191	HDDREV	3V	I	-	Host interface data bus selector.[H: general, L: reverse]
192	AGND	-	-	-	Analog GND[WWAPLL]
193	AVDD	-	-	-	Analog power 2.5V [WWAPLL]
194	WWALPF1	Analog	-	-	WWAPLL condenser connecting port.
195	WWALPF2	Analog	-	-	WWAPLL condenser connecting port.
196	WRLPF	Analog	-	-	WST DLL condenser connecting port.
197	AGND	-	-	-	Analog GND[WST DLL block]
198	AVDD	-	-	-	Analog power 2.5V [WST DLL block]
199	AVDD	-	-	-	Analog power 2.5V [WDPLL A/D block]
200	WDADVRT	Analog	-	-	WDPLL block A/D convertor condenser connecting port.
201	AWBL	Analog	I	-	Analog wobble signal input port.
202	WDADVRB	Analog	-	-	WDPLL block A/D convertor condenser connecting port.
203	AGND	-	-	-	Analog GND[WDPLL A/D block]
204	AGND	-	-	-	Analog GND[PLL block]
205	AVDD	-	-	-	Analog power 2.5V [PLL block]
206	LPFCK	Analog	-	-	Test port. It must be connected to AGND.
207	AGND	-	-	-	Analog GND[Crystal block]
208	$\overline{\text{XTAL}}$	-	I/O	-	Crystal oscillator connecting port.
209	XTAL	-	I	-	Crystal oscillator connecting port.
210	DVDD25	-	-	-	Digital power[2.5V]
211	LRCK	3V	O	Pull-up	DOUT serial audio data.
212	SCKO	3V	O	Pull-up	Serial audio data synchronizing clock output port.
213	DVDD33	-	-	-	Digital power[3.3V]
214	DGND	-	-	-	Digital GND
215	DOUT	3V	O	Pull-up	Serial audio data output port.
216	EMPH	3V	O	Pull-up	Emphasis distinguish signal.

4. IC302(uPD76f0047):MICOM

Pin Assignment



Block Diagram



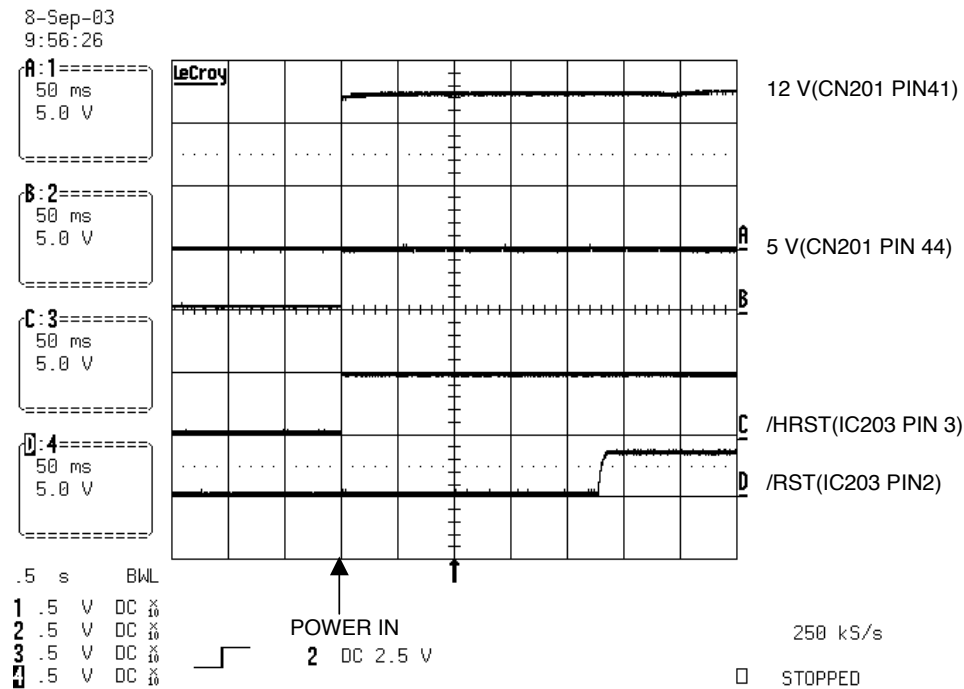
Pin description

Pin No.	Pin Name	Type	Des cription
1	AVREF0	I	A/D CONVERTER REFERENCE VOLTAGE INPUT
2	AVSS	-	A/D,D/A CONVERTER POTENTIAL
3	STEP0	O	STEPPTING MOTOR CONTROL SIGNAL
4	STEP1	O	STEPPTING MOTOR CONTROL SIGNAL
5	AVREF1	I	D/A CONVERTER REFERENCE VOLTAGE INPUT
6	TILT-MUTE	O	TILT DRIVE MUTE SIGNAL
7	SBRK	O	EXTERNAL MEMORY ADDRESS BUS
8	FLMD0	I	FLASH PROFLAMING MODE
9	VDD	-	I NTERNAL CONSTANT POWER
10	VDDOSC	-	CONSTANT POWER
11	VSS	-	INTERNAL GROUND POTENTIAL
12	X1	I	MAIN CLOCK
13	X2	-	MAIN CLOCK
14	/RESET	I	SYSTEM RESET
15	(RESERVED)	-	-
16	/CS-DSP	O	CHIP SELECTOR OUPUT
17	(RESERVED)	-	-
18	OPCTRQ	I/O	WOBBLE FM DE M ODUL ATI ON DATA
19	/UINT	I	INTERRUPTED REQUEST SIGNAL INPUT
20	WGATE	I	DRIVER WRITER LASER CONTROL SIGNAL
21	DRV-CTRL0	-	-
22	SIB0	I	SERIAL CLOCK
23	EFM-ERR	-	-
24	WBL-CRC	-	-
25	TXD	O	SERIAL CLOCK
26	RXD	I	SERIAL CLOCK
27	RECD	I	NO RECODRDING AREA DETECTION
28	SFG	I	FG SIGNAL INPUT
29	TEZC	I	TRACK ZERO CROSS SIGNAL INPUT
30	SVMON	I	SERVO BLOCK MONITOR SIGNAL
31	MON3	I	M ONI TOR TEST SINGNAL
32	MON2	I	M ONI TOR TEST SINGNAL
33	EVSS	-	EXTERNAL CONSTANT POWER
34	EVDD	-	EXTERNAL CONSTANT POWER
35	MON1	I	MONITOR TEST SINGNAL
36	MON0	I	MONITOR TEST SINGNAL
37	ASYLPF	-	-
38	WBLPF	-	-
39	LJJ-CTRL1	-	-
40	LJJ-CTRL2	-	-
41	DV D/CD	-	-
42	PU-CTRL1	O	PD IC GAIN CONTROL SIGNAL
43	RST-DSP	O	RESET OUT
44	WR/RE	O	PD IC GAIN COTTROL SI NAL(WRITE/READ)
45	RW/R	-	-
46	LDEN-DVD	O	PICK-UP LD ENABLE SIGNAL (DV D)
47	LDEN-CD	O	PIC K-UP LD ENABLE SIGNAL (C D)
48	SCLK	O	REGISTER SETTING CLOCK
49	SDATAI	I	REGISTER SETTING DATA INPUT
50	SDATAO	O	REGISTER SETTING DATA OUTPUT

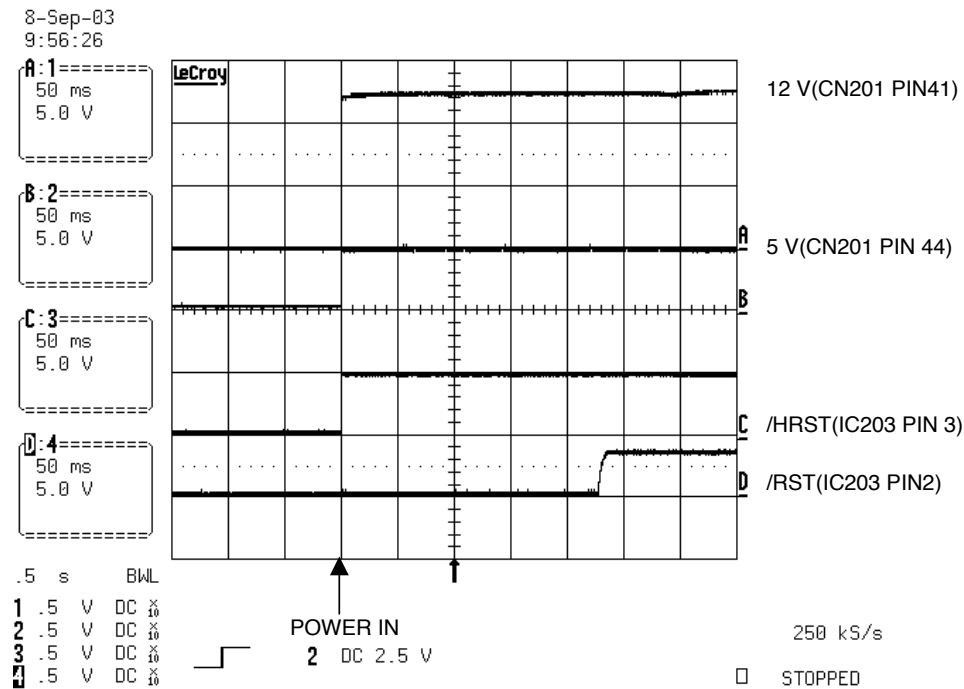
Pin No.	Pin Name	Type	Des cription
51	CP	O	REGISTER ADDRESS OUPUT
52	/DACS	O	CHIP SELECTOR
53	/BPRCS	O	EEPROM COMM UNICATON LINE
54	TEST MOD0	-	-
55	TEST MOD1	-	-
56	(RESERVED)	-	-
57	(RESERVED)	-	-
58	LED	O	LED ENABLE LINE
59	MSW	O	LED ENABLE LINE
60	/EJECT-KEY	O	TRAY OPE N LINE
61	URDY	O	ACCESS CONTROL SIGNAL INPUT FRON CPU TO SDRAM
62	(RESERVED)	-	-
63	/OPEN-SW	I	OPEN S/W INPUT
64	/LOAD-SW	I	LOAD S/W INPUT
65	/WR	O	WRITE STROBE SIGNAL OUTPUT
66	(RESERVED)	-	-
67	/RD	O	READ STROBE SIGNAL OUPUT
68	ASTB	O	ADDRESS STROBE OUPUT
69	EVSS	-	EX TERNAL CONSTANT POWER
70	EVDD	-	EX TERNAL CONSTANT POWER
71	AD0	I/O	PORT DL 16BIT INPUT/OUTPUT
72	AD1	I/O	PORT DL 16BIT INPUT/OUTPUT
73	AD2	I/O	PORT DL 16BIT INPUT/OUTPUT
74	AD3	I/O	PORT DL 16BIT INPUT/OUTPUT
75	AD4	I/O	PORT DL 16BIT INPUT/OUTPUT
76	AD5	I/O	PORT DL 16BIT INPUT/OUTPUT
77	AD6	I/O	PORT DL 16BIT INPUT/OUTPUT
78	AD7	I/O	PORT DL 16BIT INPUT/OUTPUT
79	A8	I/O	PORT DL 16BIT INPUT/OUTPUT
80	A9	I/O	PORT DL 16BIT INPUT/OUTPUT
81	A10	I/O	PORT DL 16BIT INPUT/OUTPUT
82	A11	I/O	PORT DL 16BIT INPUT/OUTPUT
83	A12	I/O	PORT DL 16BIT INPUT/OUTPUT
84	A13	I/O	PORT DL 16BIT INPUT/OUTPUT
85	A14	I/O	PORT DL 16BIT INPUT/OUTPUT
86	(RESERVED)	I/O	PORT DL 16BIT INPUT/OUTPUT
87	/LIMIT-SW	I	TRAY LIMIT S/W INPUT
88	MA/SL	I	MASTER/SLAVE MODE SELECTOR
89	AUDMUTE	-	-
90	LOAD1	O	STANDBY/BRAKE CONTROL SIGNAL
91	LOAD2	O	STANDBY/BRAKE CONTROL SIGNAL
92	(RESERVED)	-	-
93	SKEW2	-	-
94	SKEW1	-	-
95	FPD	I	TEMPERATURE MONITOR CURRENT INPUT
96	TEMP	I	MONITOR TEST SINGNAL
97	MONI3	I	FOCUS ERROR INPUT
98	MONI2	I	LASER MONITOR CURRENT INPUT
99	MONI1	I	PDIC REFERNEC VOLTAGE
100	VC+1.5V	I	VCC 1.5V INPUT

WAVEFORMS

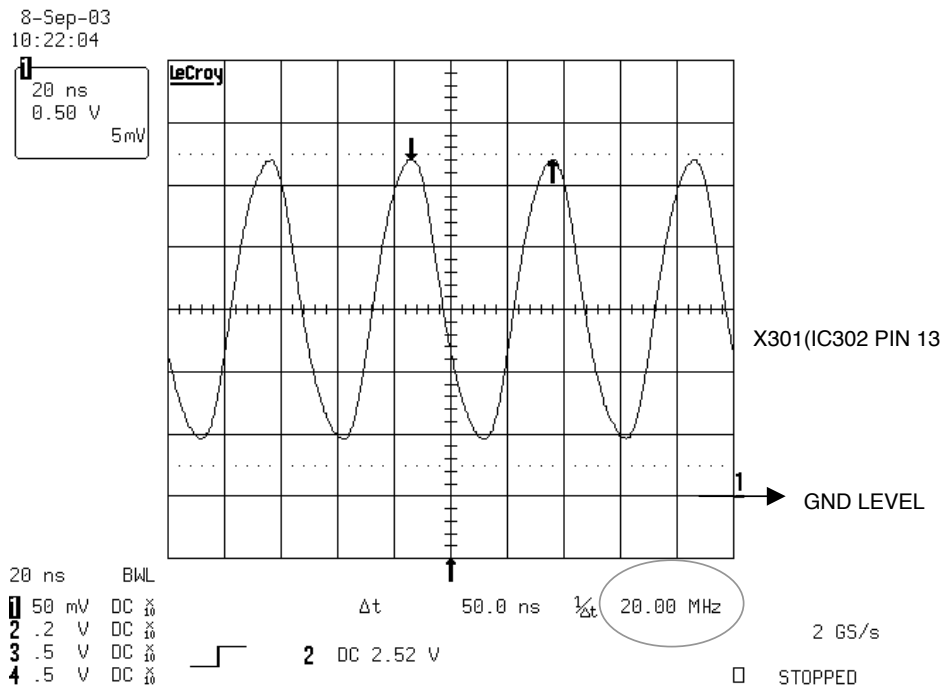
1. POWER & RESET Signal



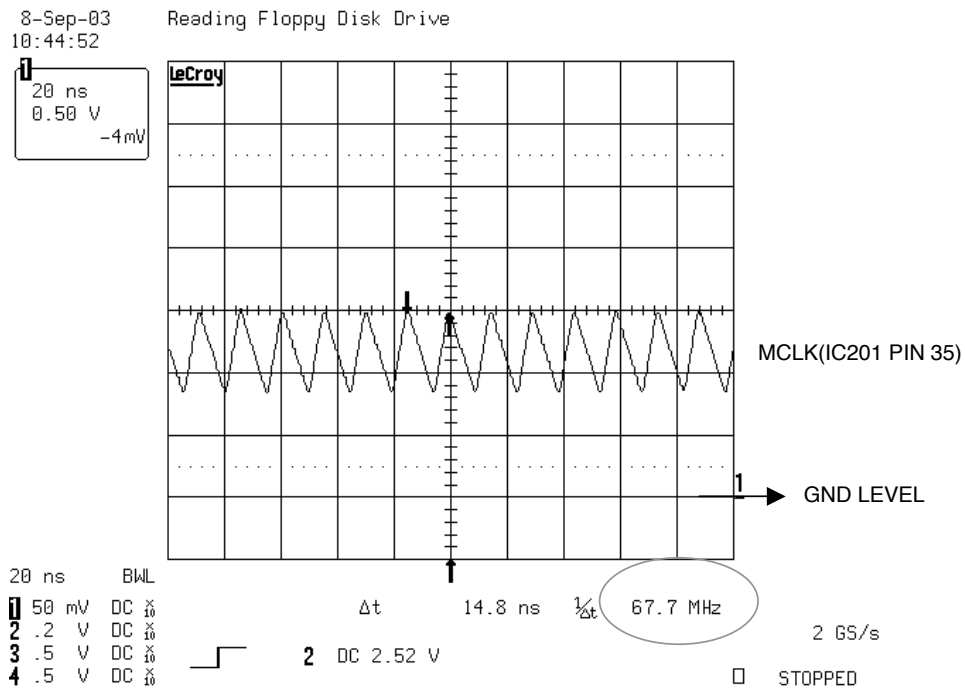
2. Main Clock1 for IC202 (16.9MHz)



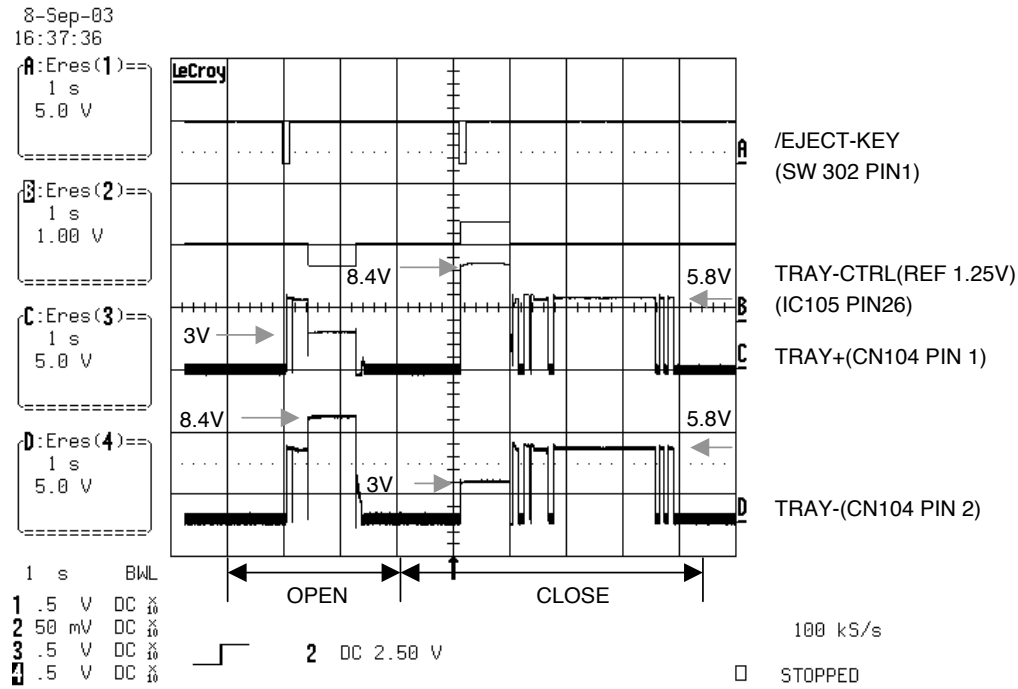
3. Main Clock2 for IC302 (20MHz)



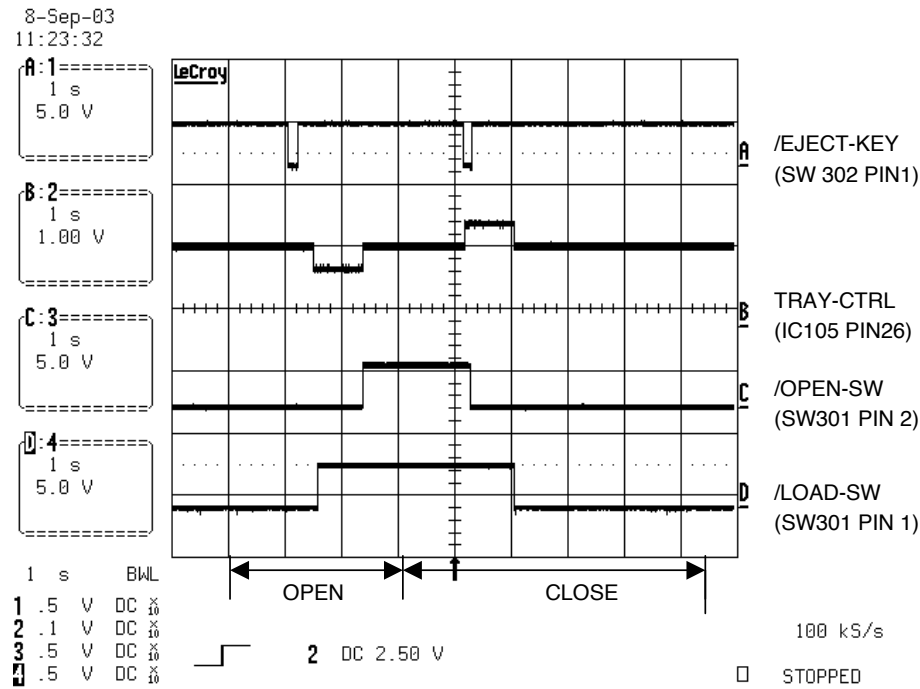
4. SDRAM Clock



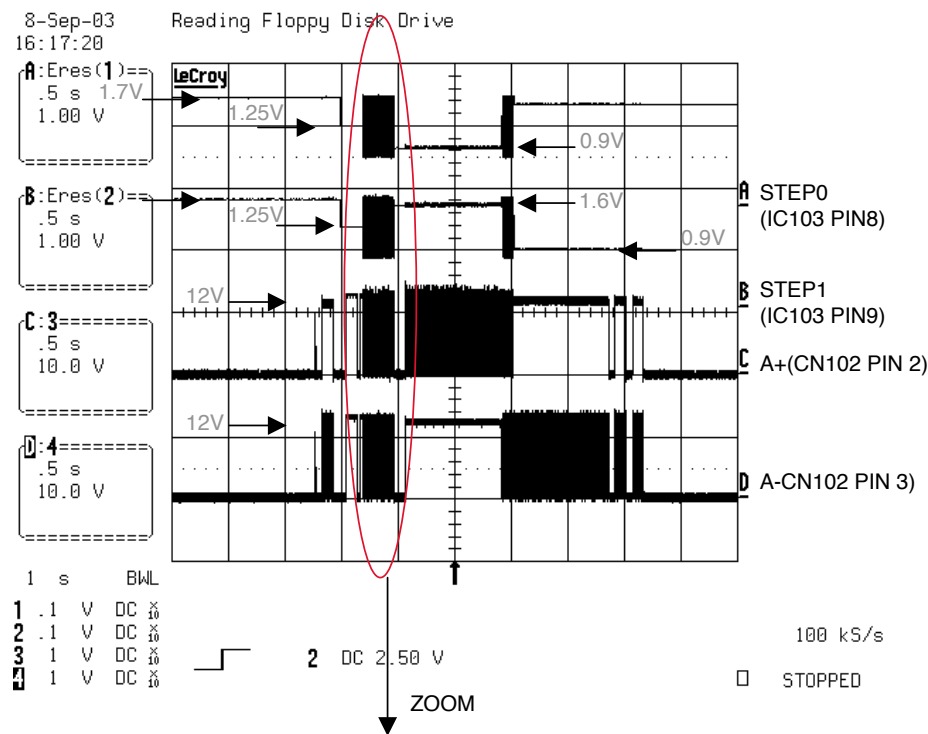
5. TRAY OPEN/CLOSE SIGNAL 1



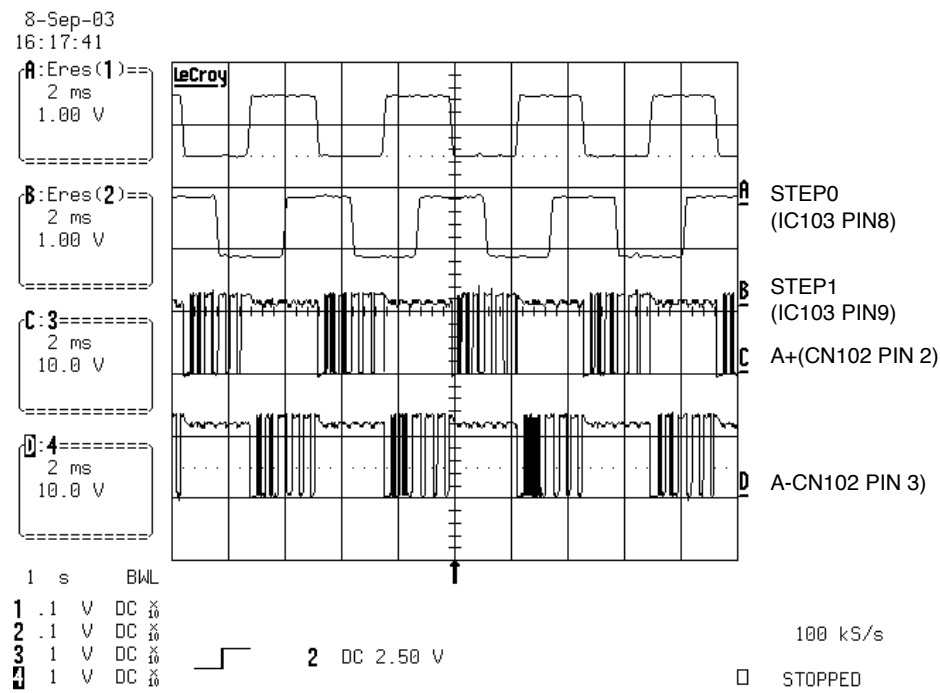
6. TRAY OPEN/CLOSE SIGNAL 2



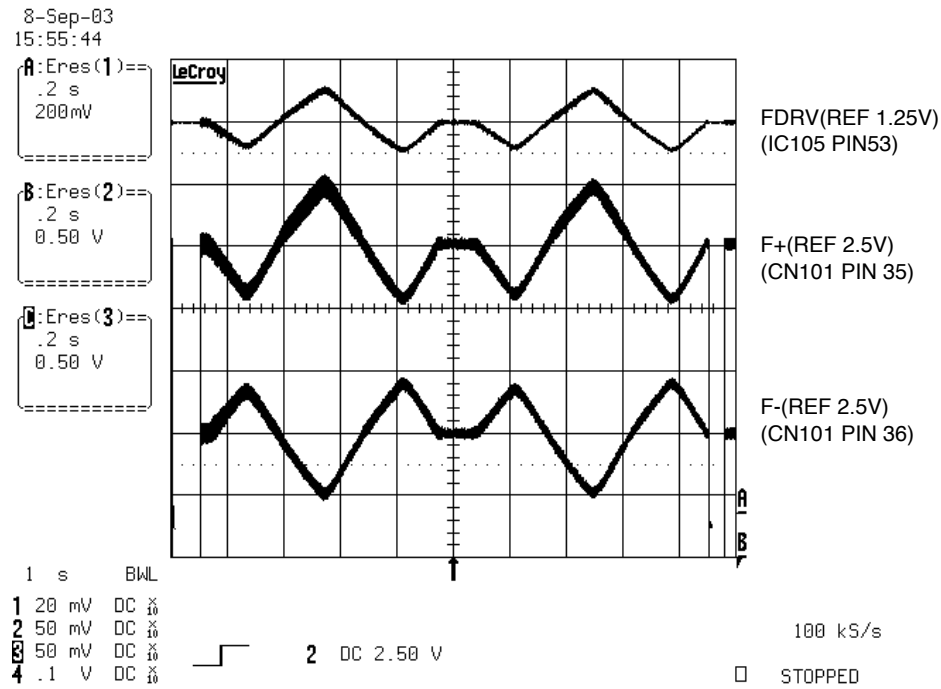
7. SLED MOVE SIGNAL 1



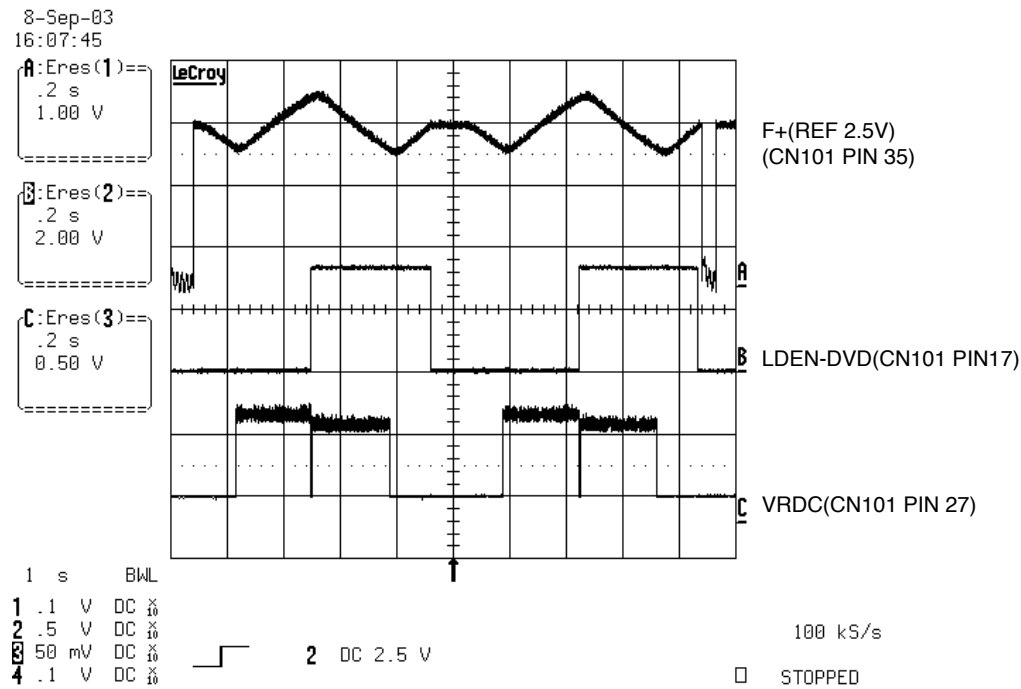
8. SLED MOVE SIGNAL 2



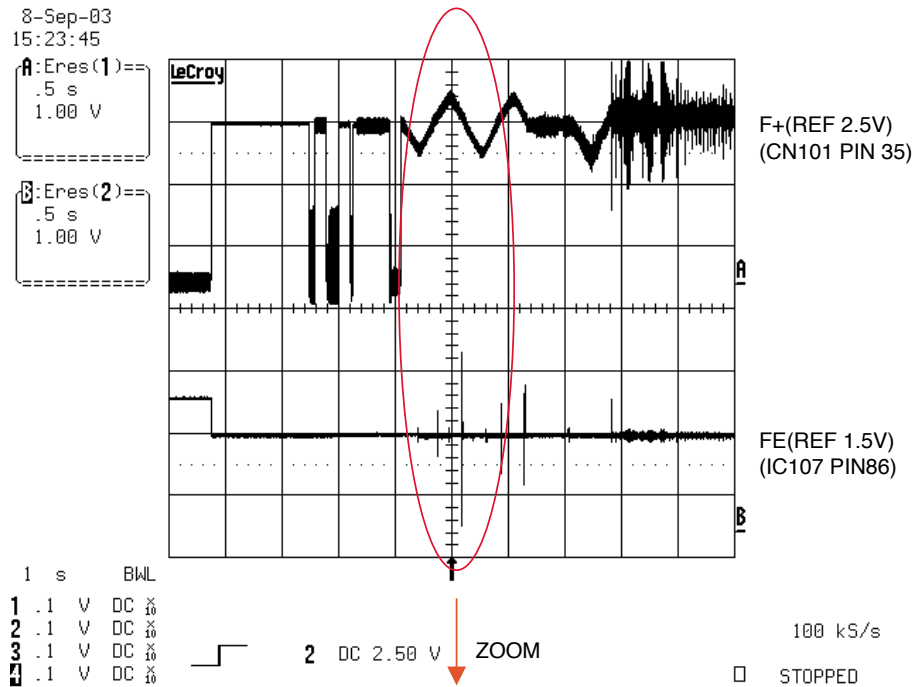
9. FOCUS SEARCH SIGNAL



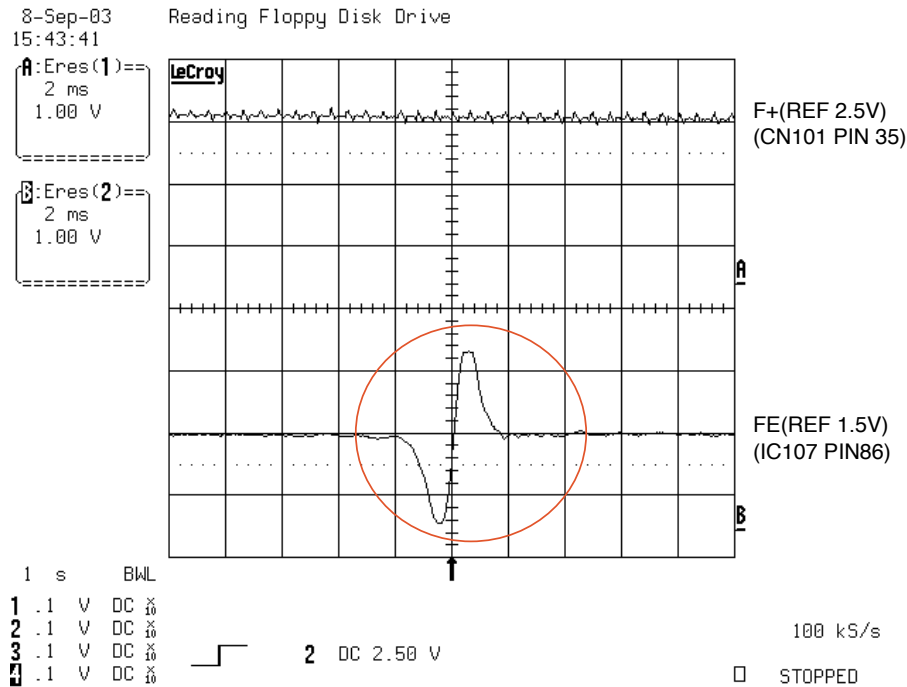
10. LASER TURN ON SIGNAL



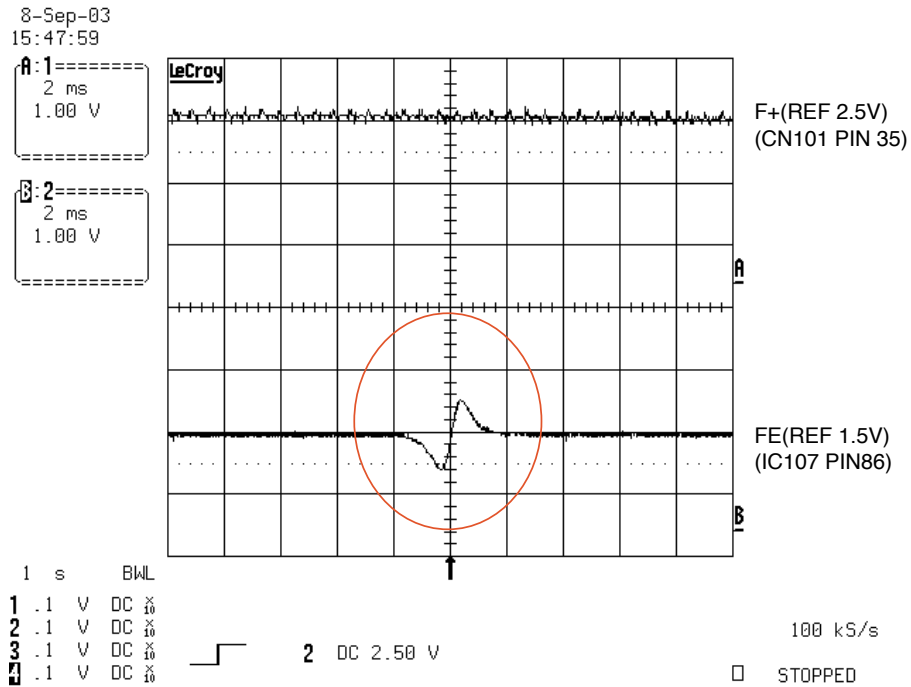
11. DISC TYPE JUDGEMENT WAVEFORM (CD SERIES)



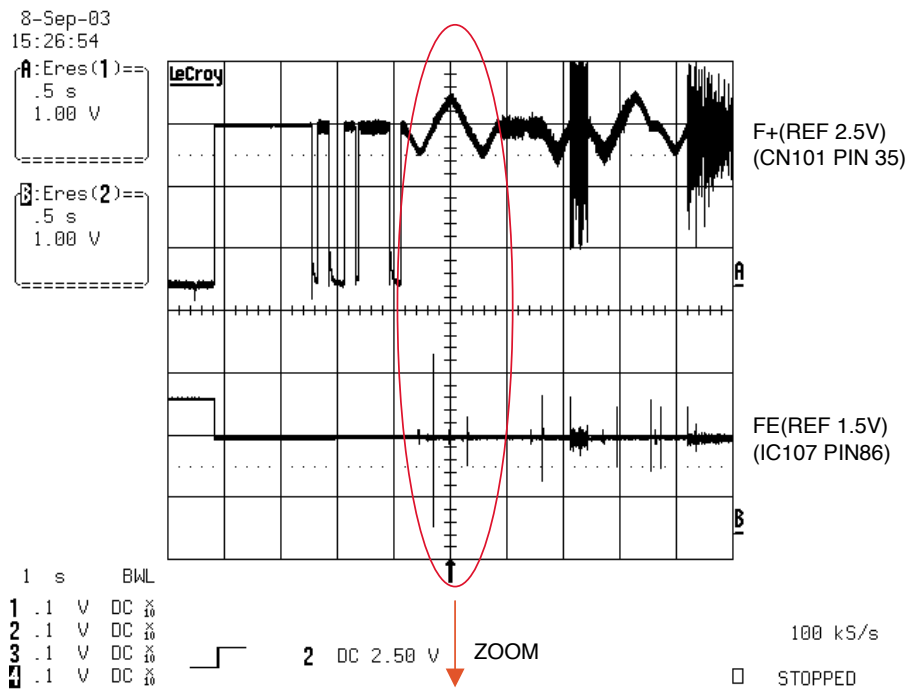
12. DISC TYPE JUDGEMENT WAVEFORM (CD&CD-R)



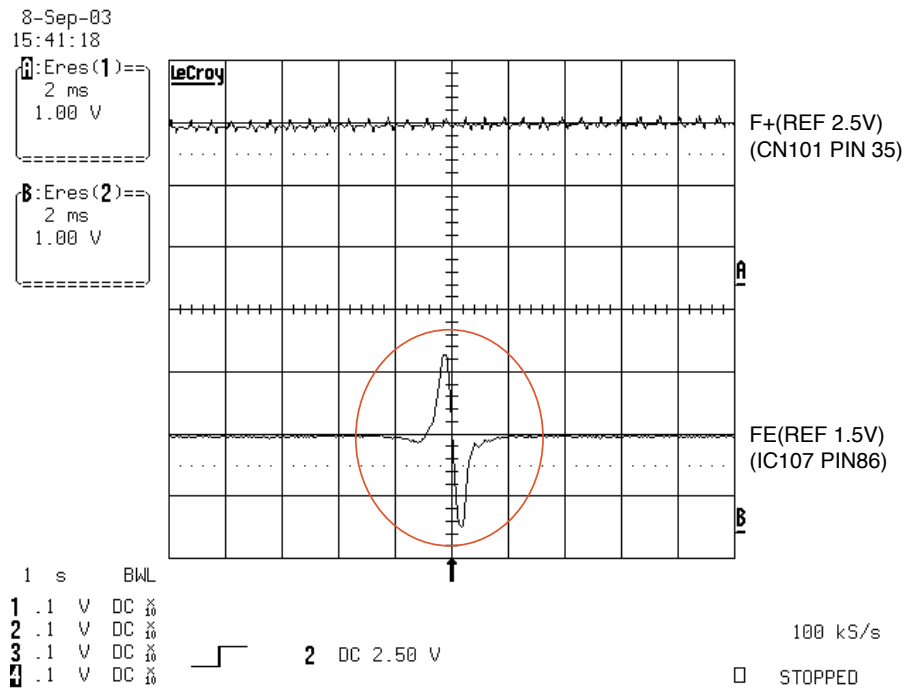
13. DISC TYPE JUDGEMENT WAVEFORM (CD-RW)



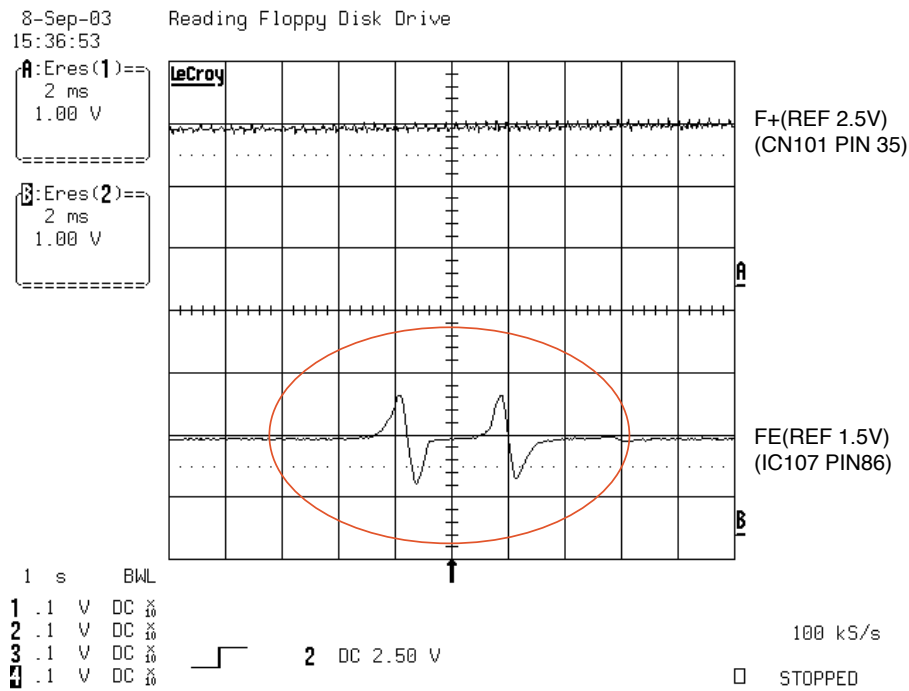
14. DISC TYPE JUDGEMENT WAVEFORM (DVD SERIES)



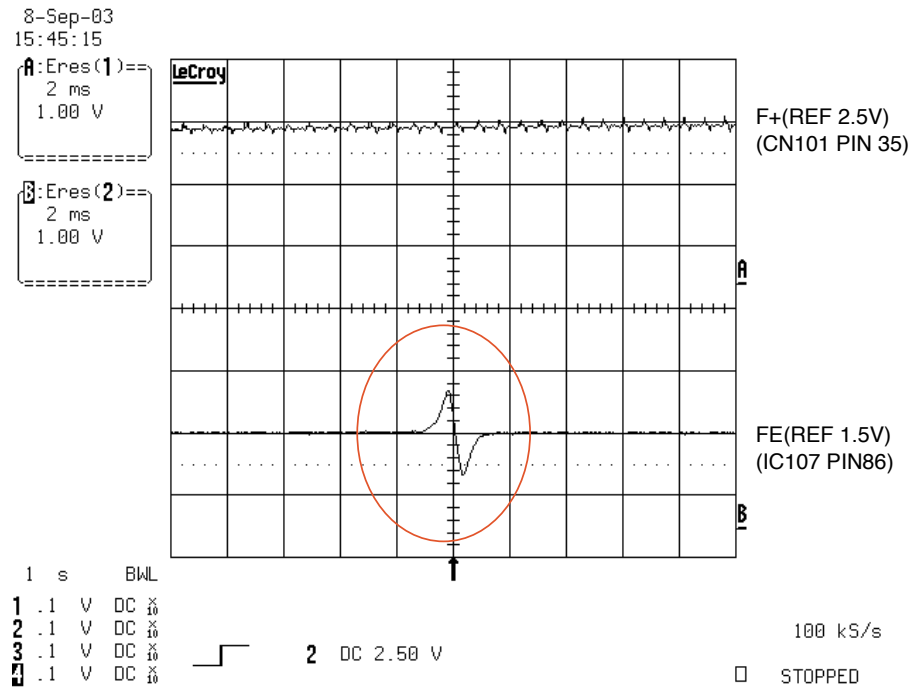
15. DISC TYPE JUDGEMENT WAVEFORM (DVD_SINGLE&R)



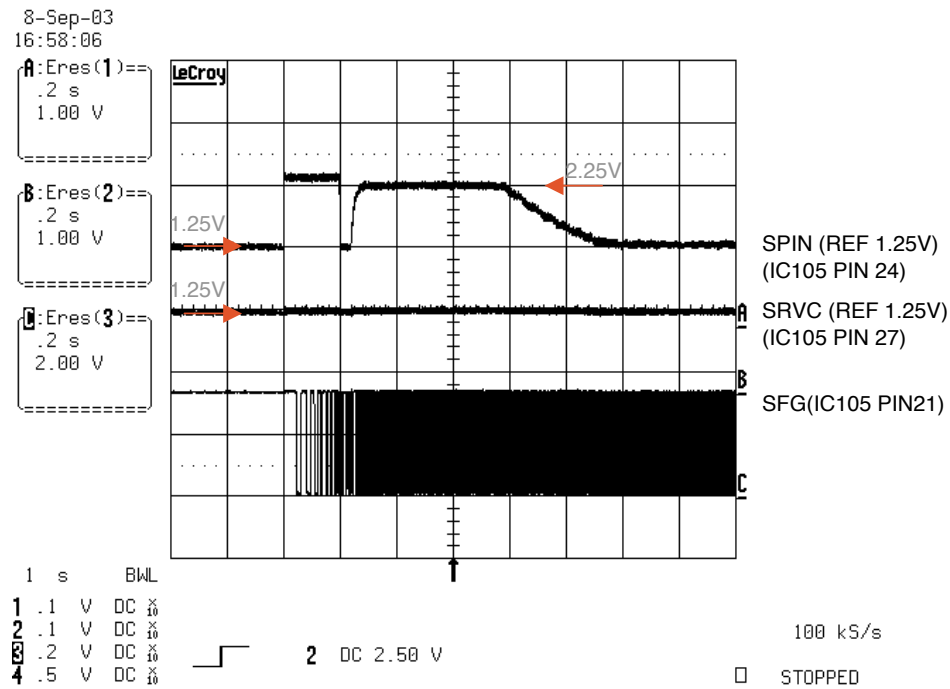
16. DISC TYPE JUDGEMENT WAVEFORM (DVD _DUAL)



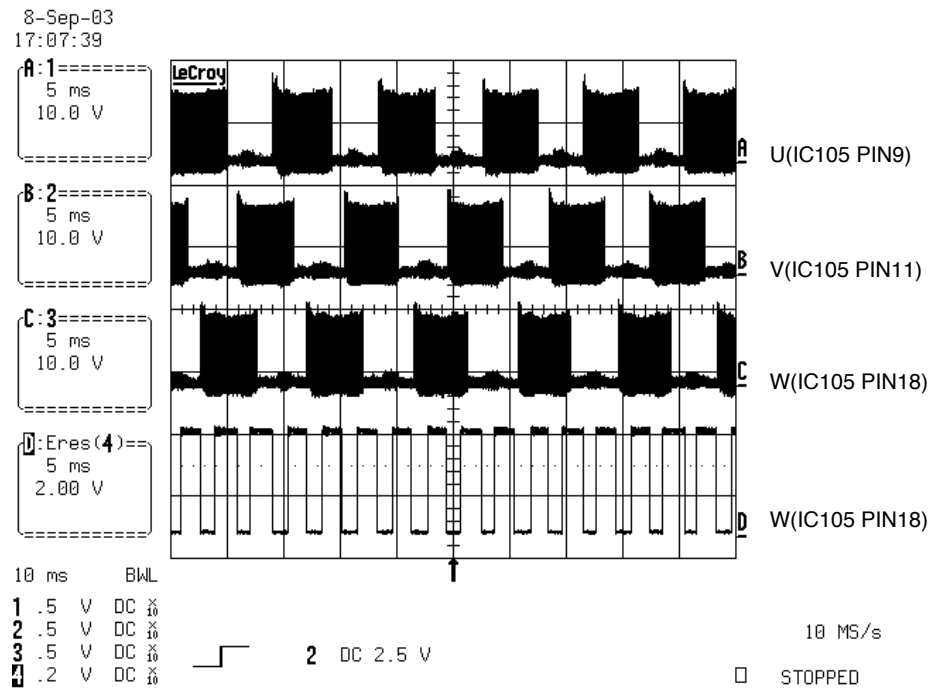
17. DISC TYPE JUDGEMENT WAVEFORM (DVDRW)



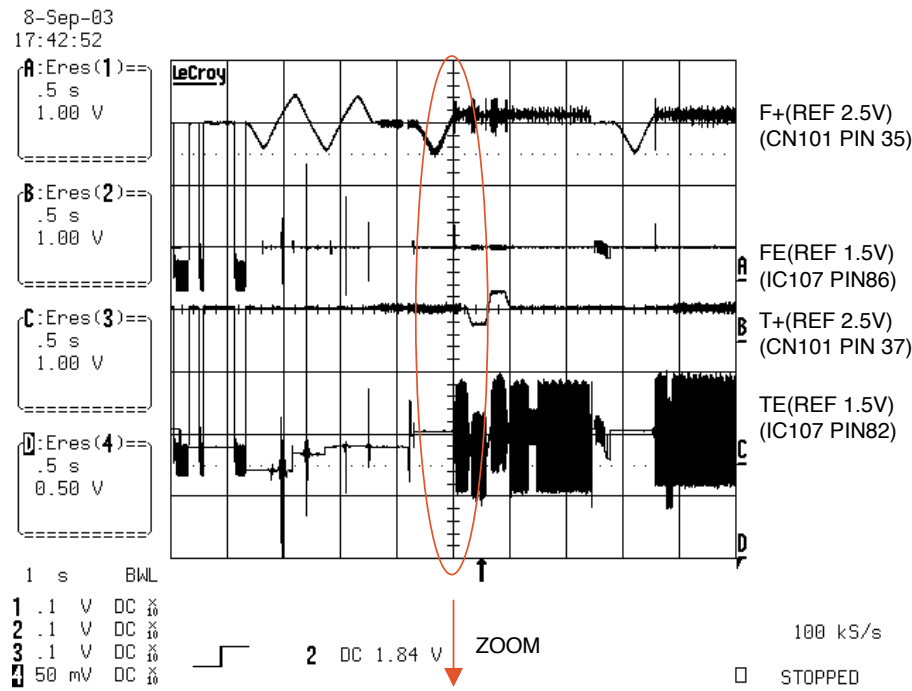
18. SPINDLE WAVEFORM1



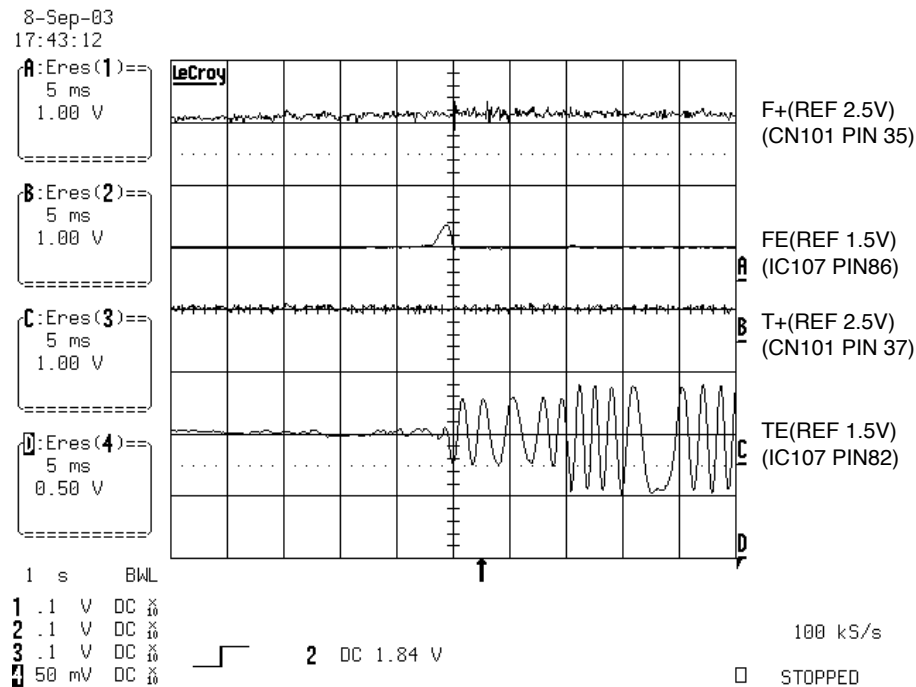
19. SPINDLE WAVEFORM2



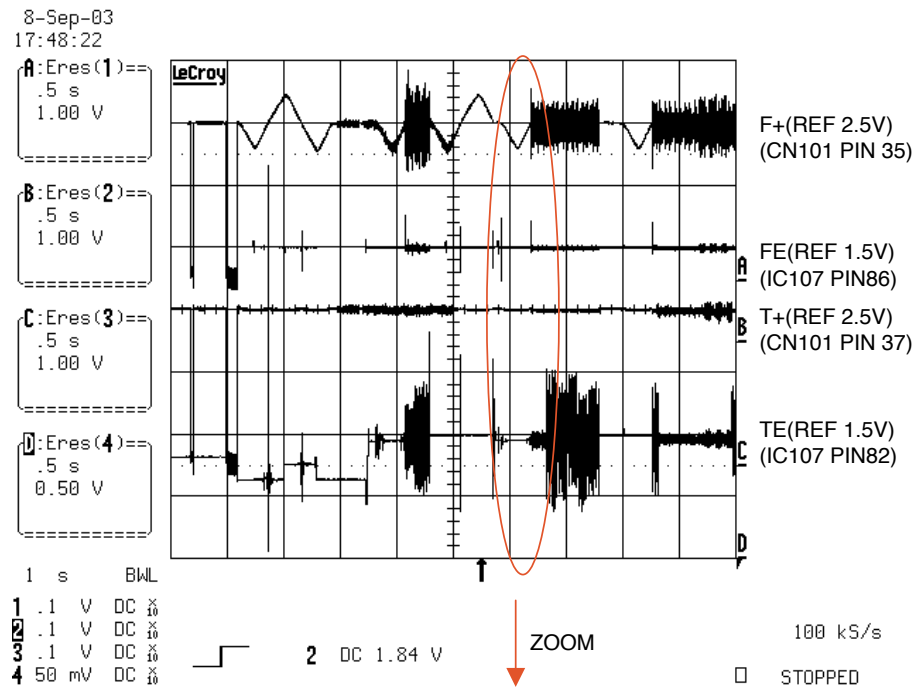
20. FOCUS ON SIGNAL(CD)



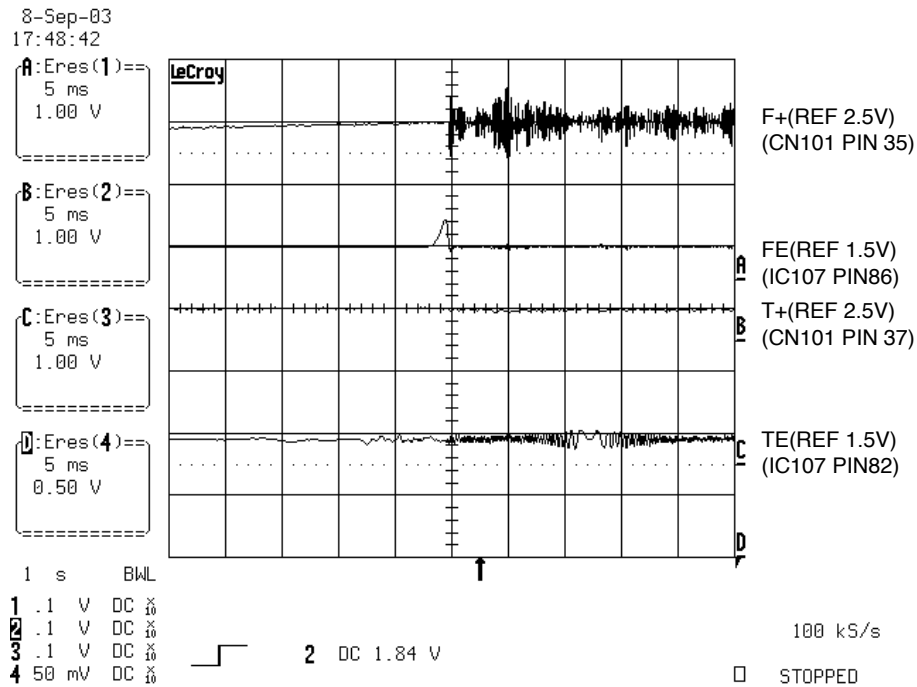
21. FOCUS ON SIGNAL(CD)



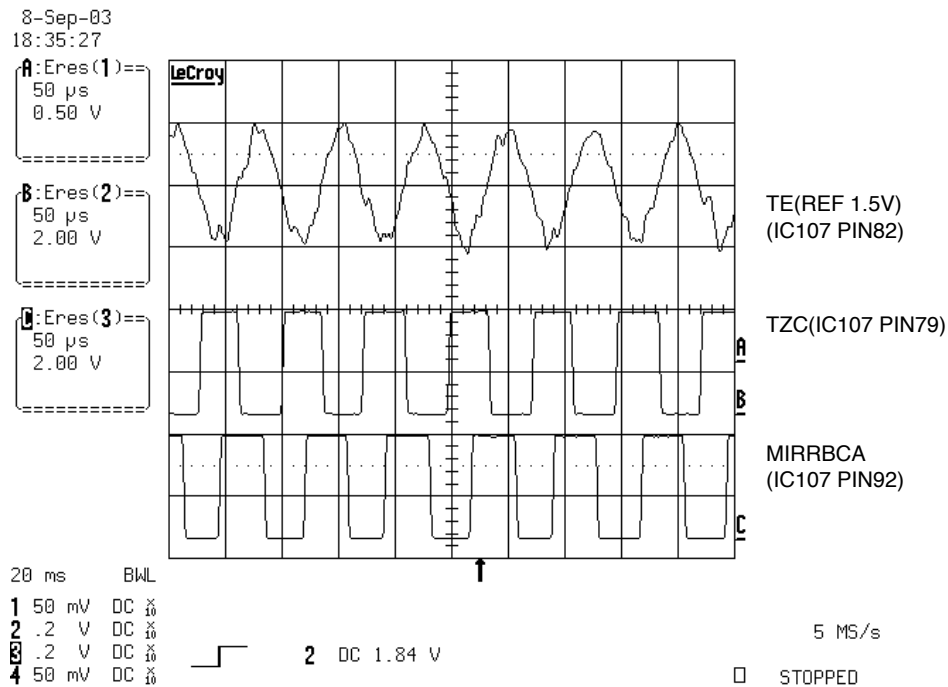
22. FOCUS ON SIGNAL(DVD)



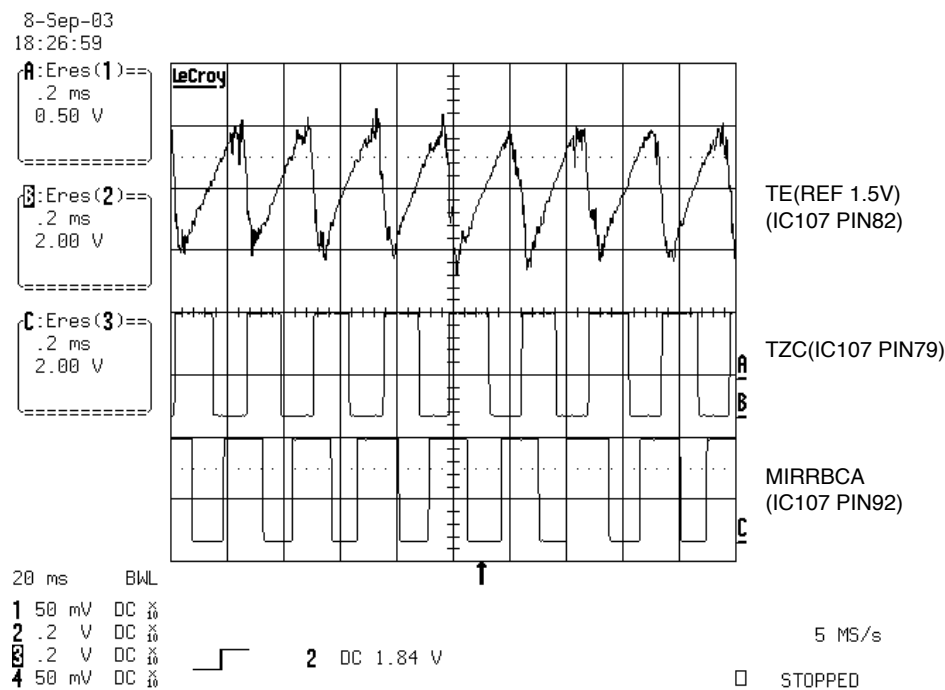
23. FOCUS ON SIGNAL (DVD)



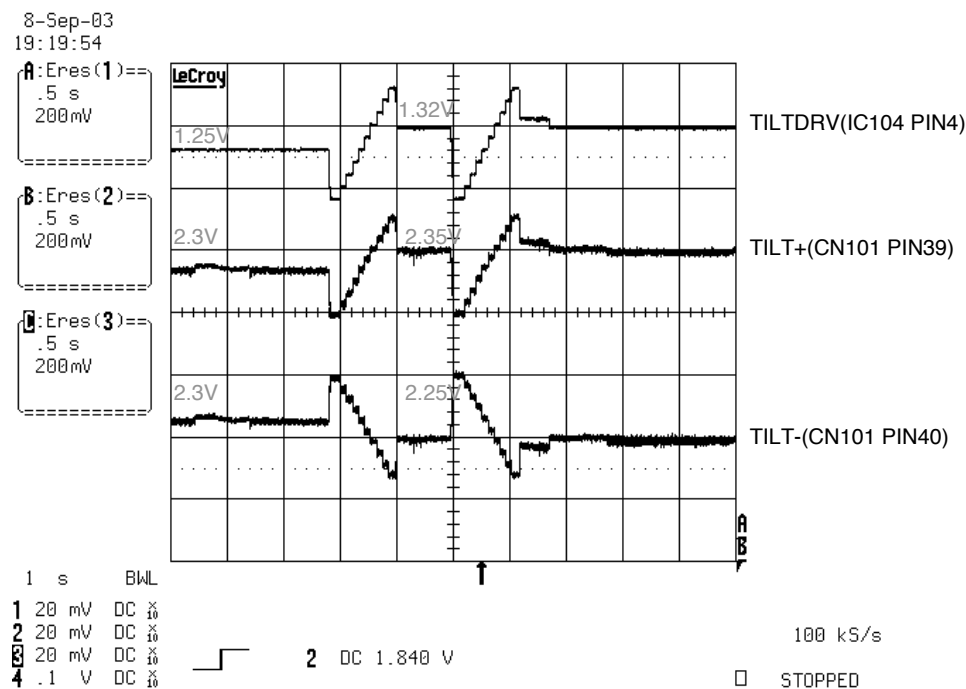
24. TRACK OFF SIGNAL(CD)



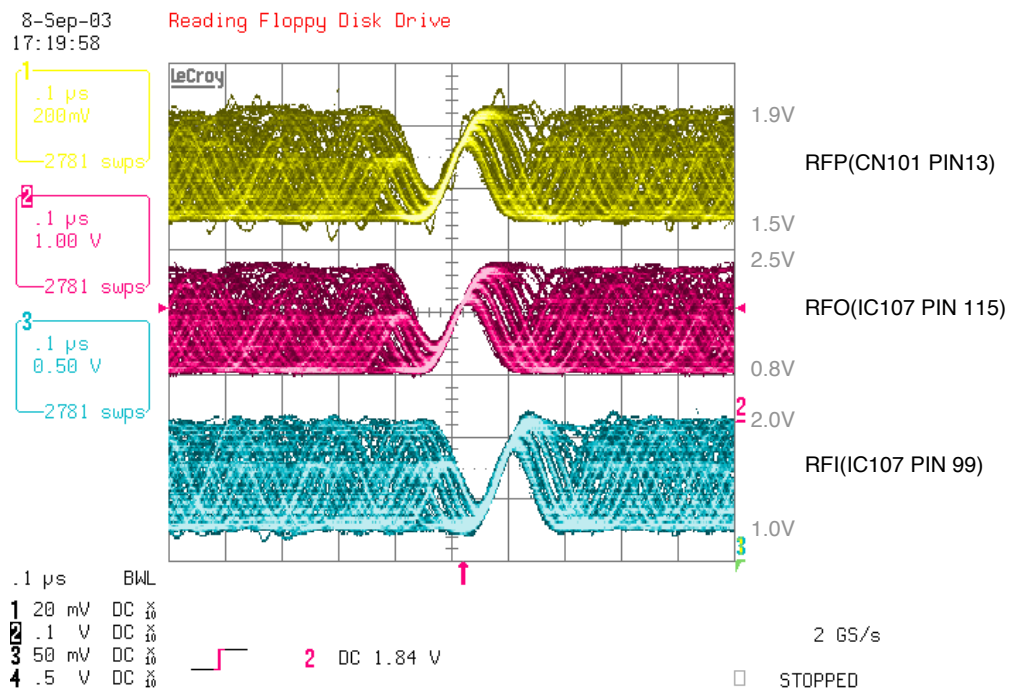
25. TRACK OFF SIGNAL(DVD)



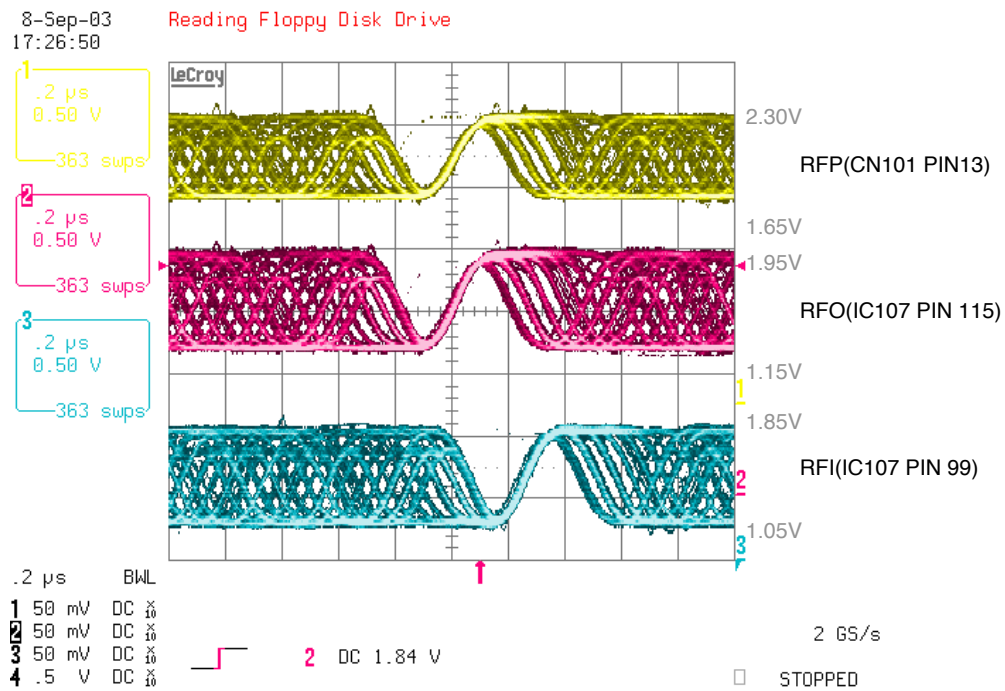
26. Tilt Driver signal(Disc reading)



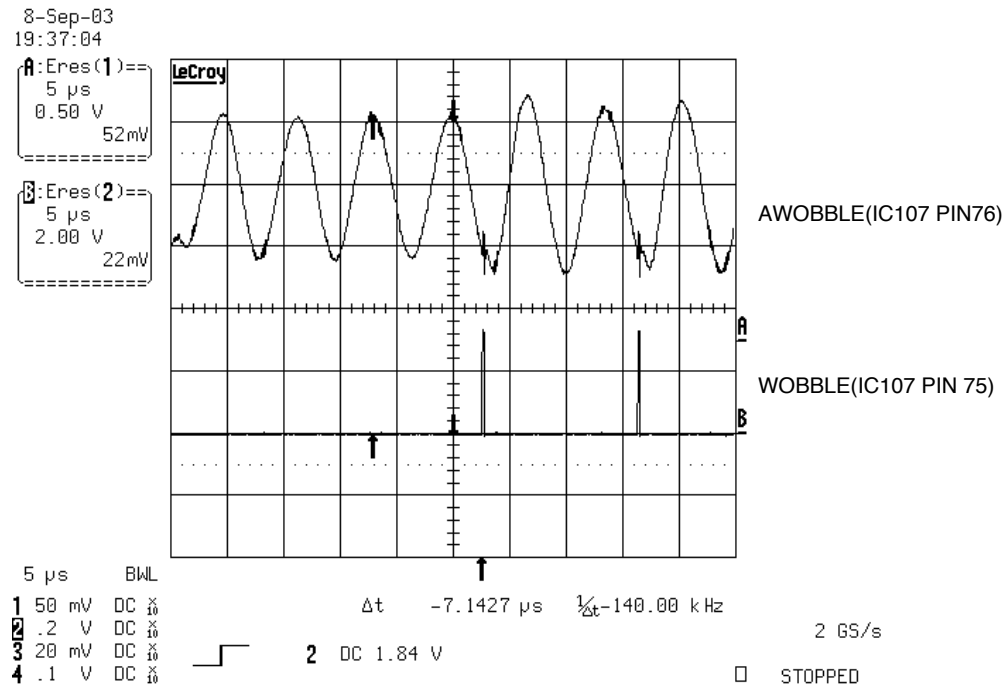
27. RF WAVEFORM(DVD)



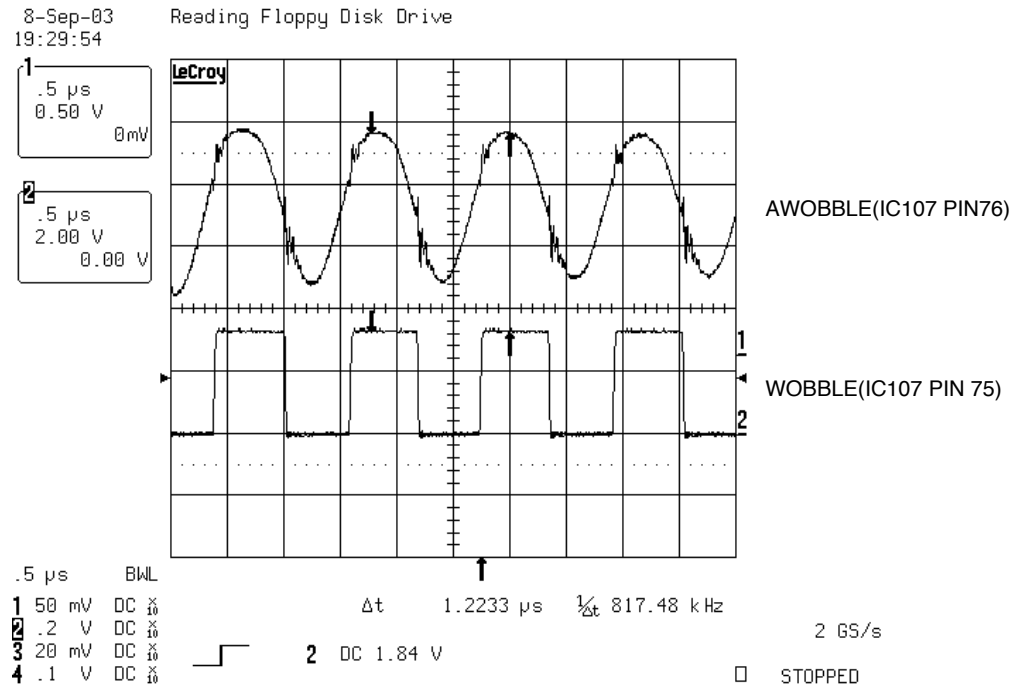
28. RF WAVEFORM(CD)



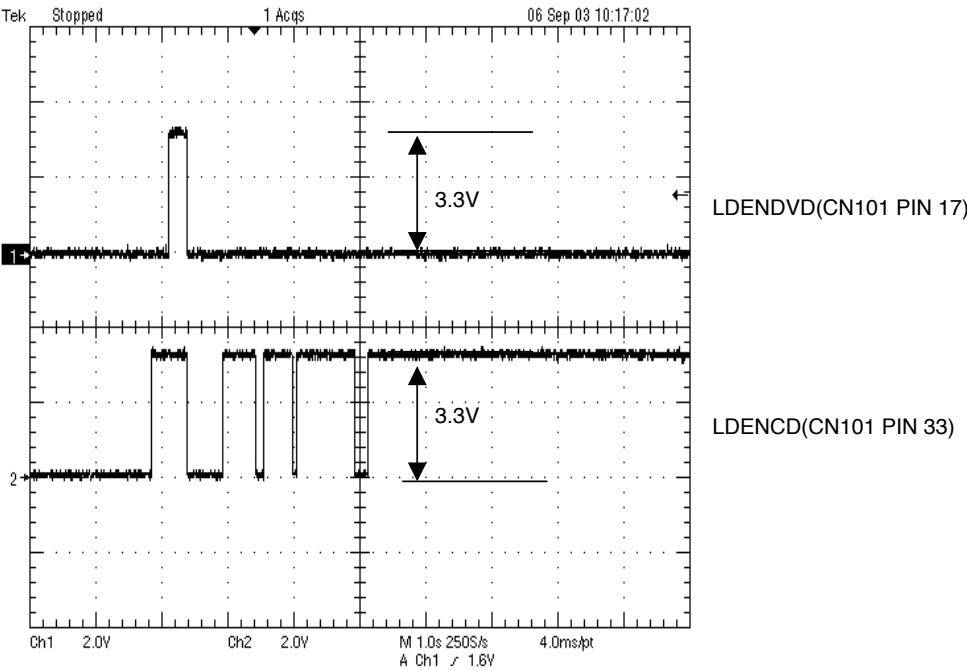
29. WOBBLE(DVD-R/RW)_READING



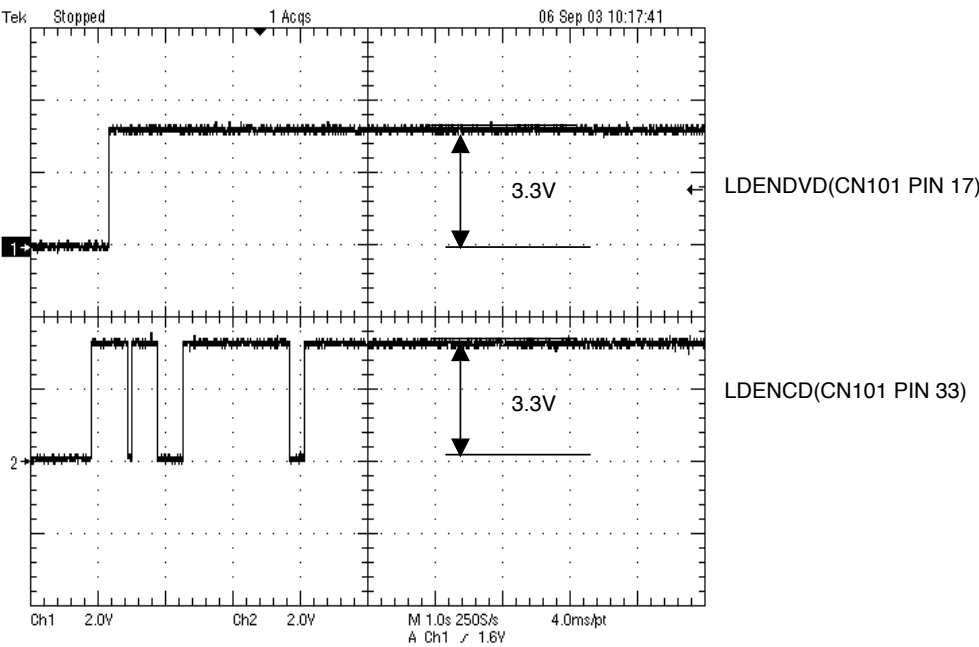
30. WOBBLE(DVD+R/RW)_READING&WRITING =>X1 SPEED



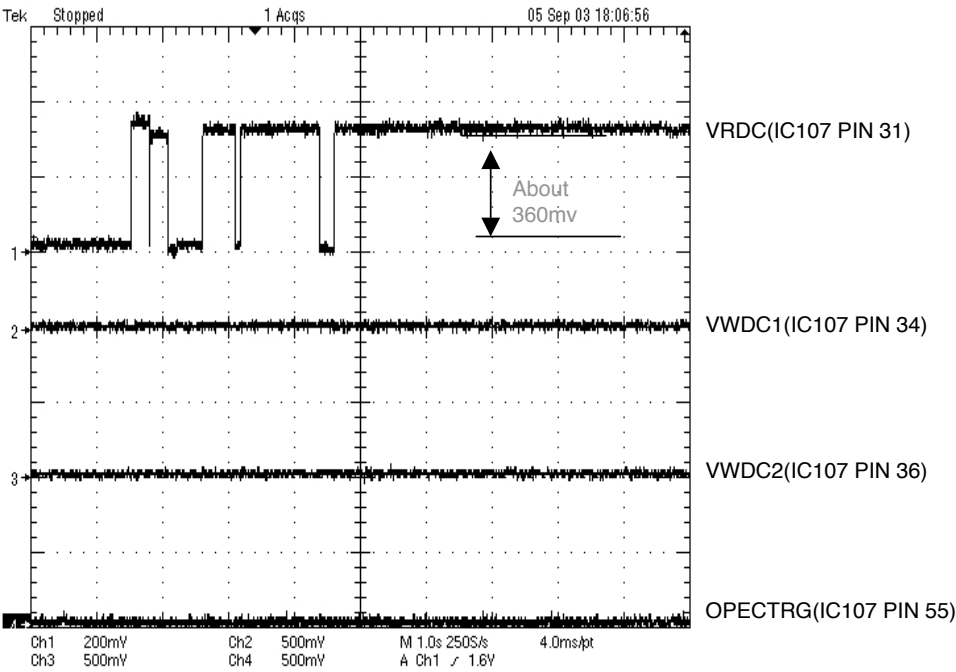
31. LD Enable(DVD)



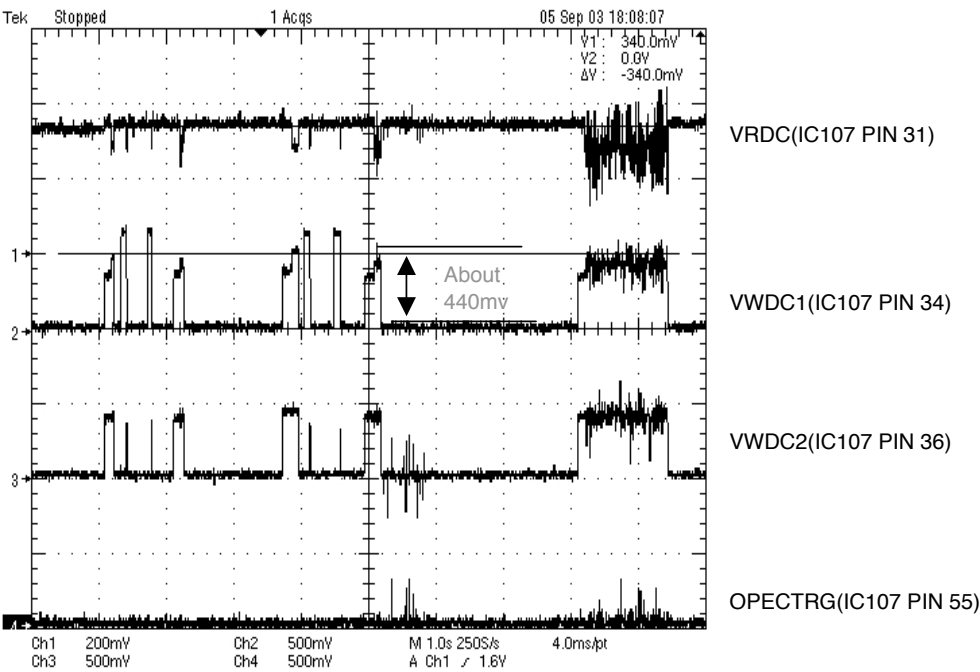
32. LD Enable(CD)



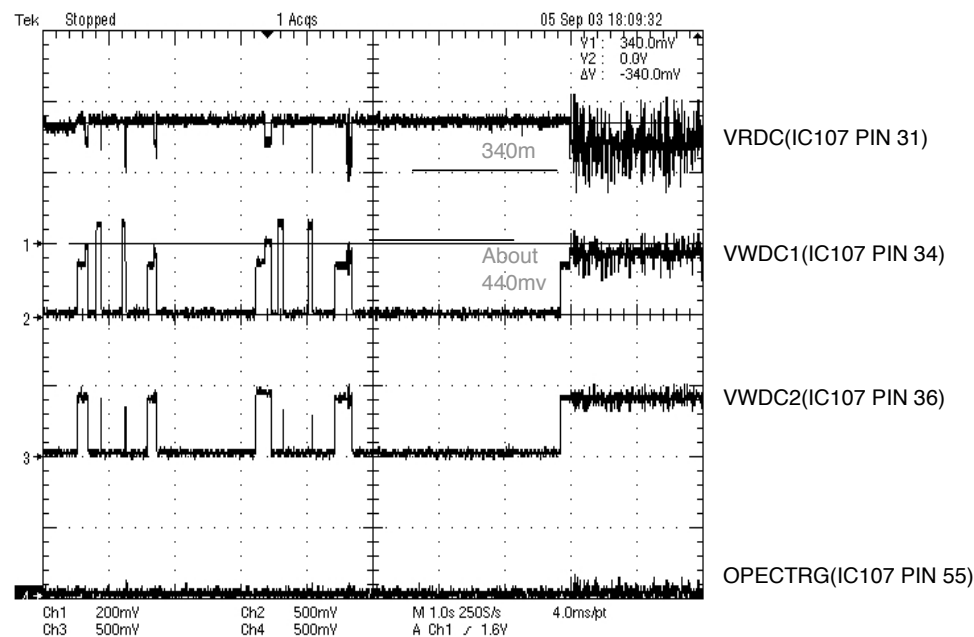
33. Laser Power(reading)_DVD+RW



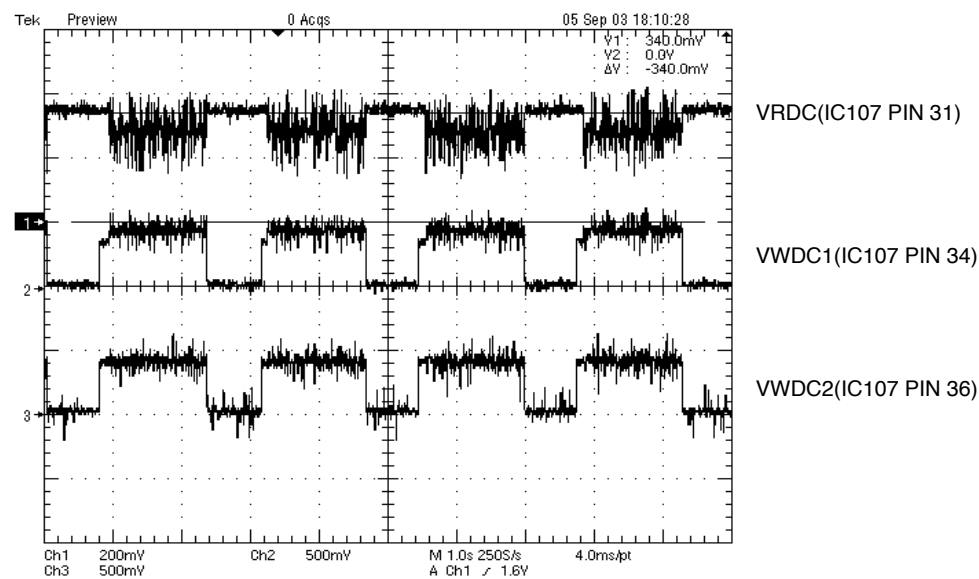
34. Laser Power(Erase)_DVD+RW



35. Laser Power(Writing)_initial state



36. Laser Power(Writing)_Processing

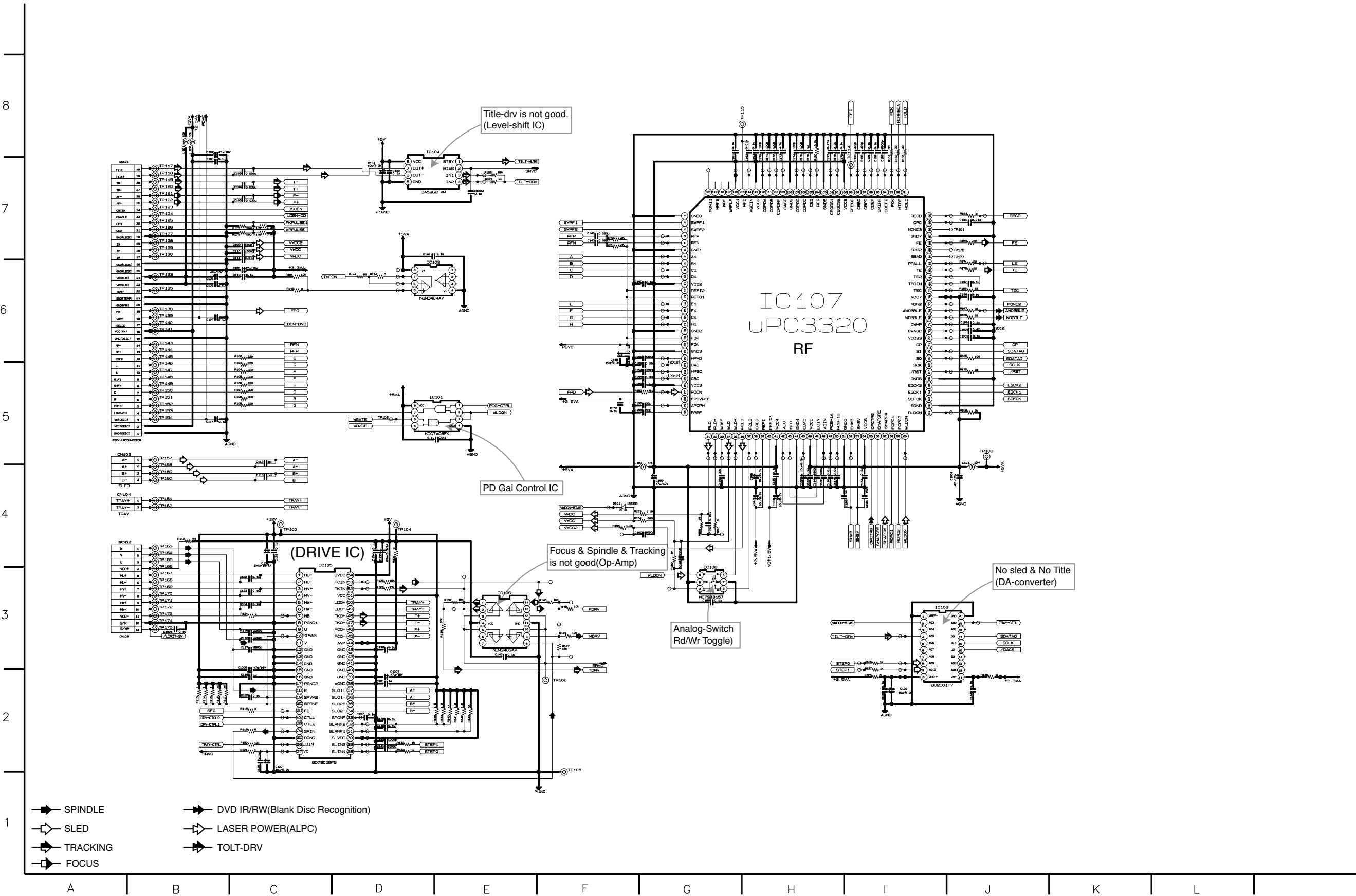


MEMO

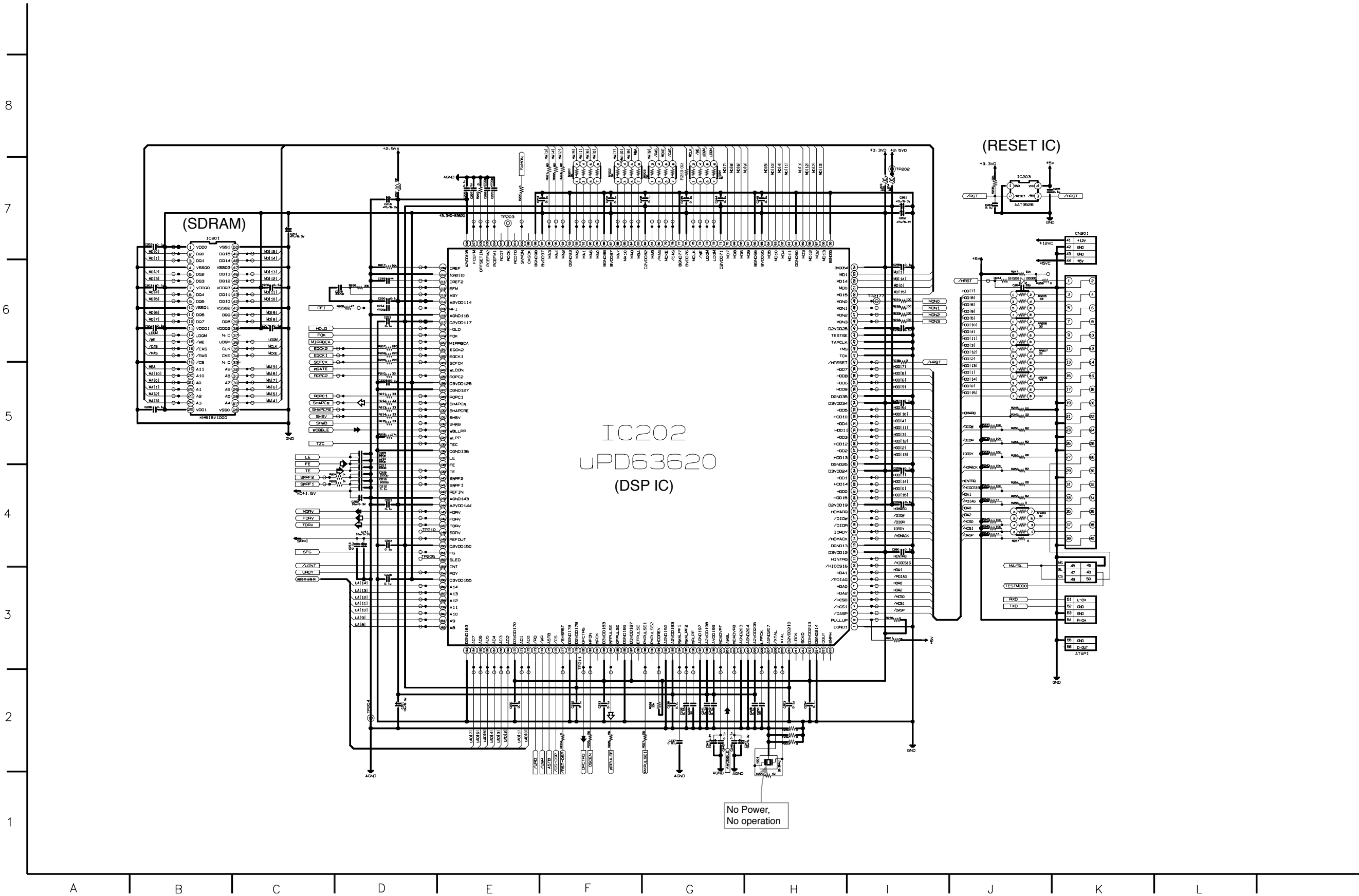
A series of horizontal dotted lines for writing.

CIRCUIT DIAGRAMS

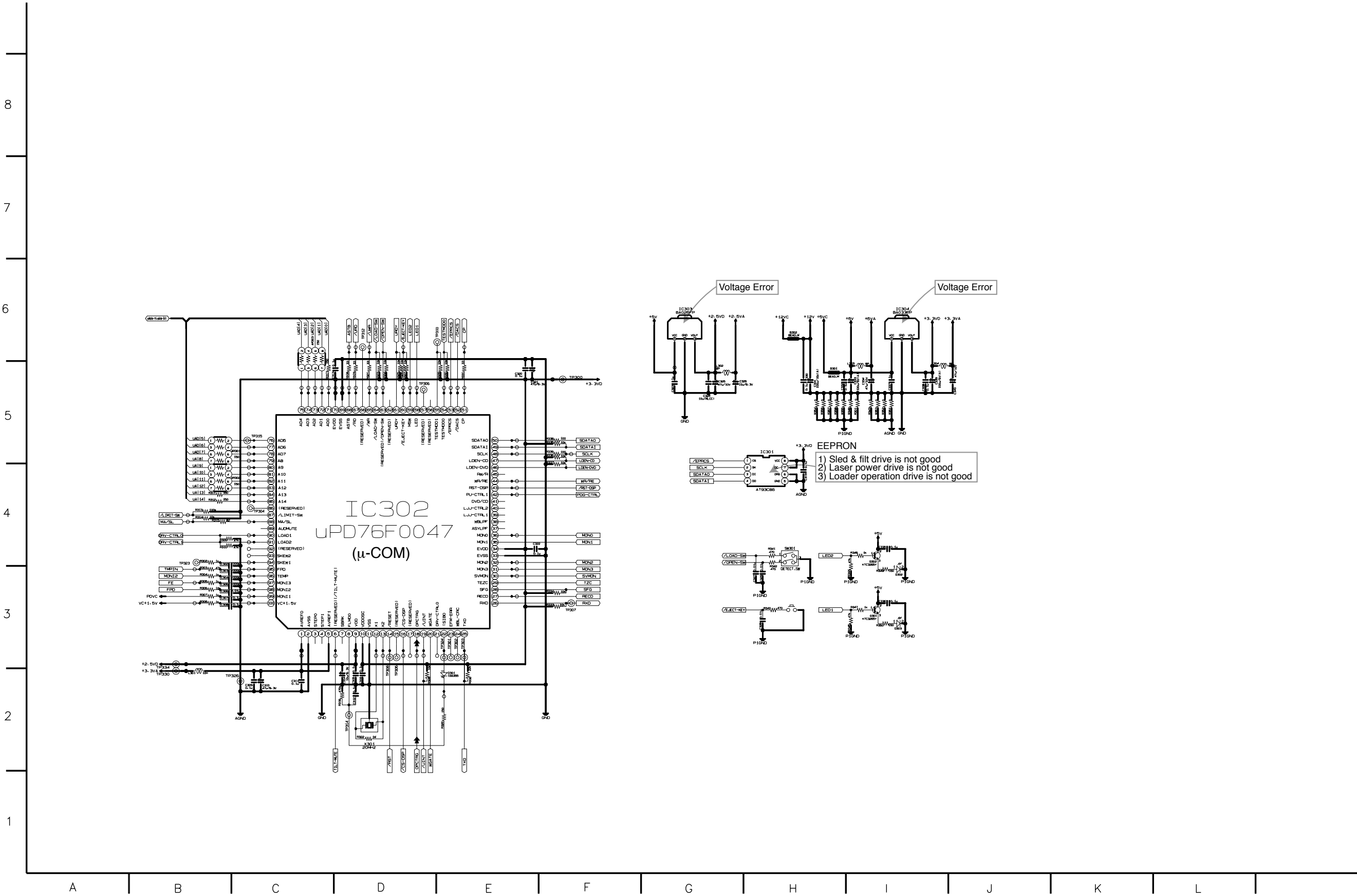
1. RF CIRCUIT DIAGRAM



2. DSP CIRCUIT DIAGRAM

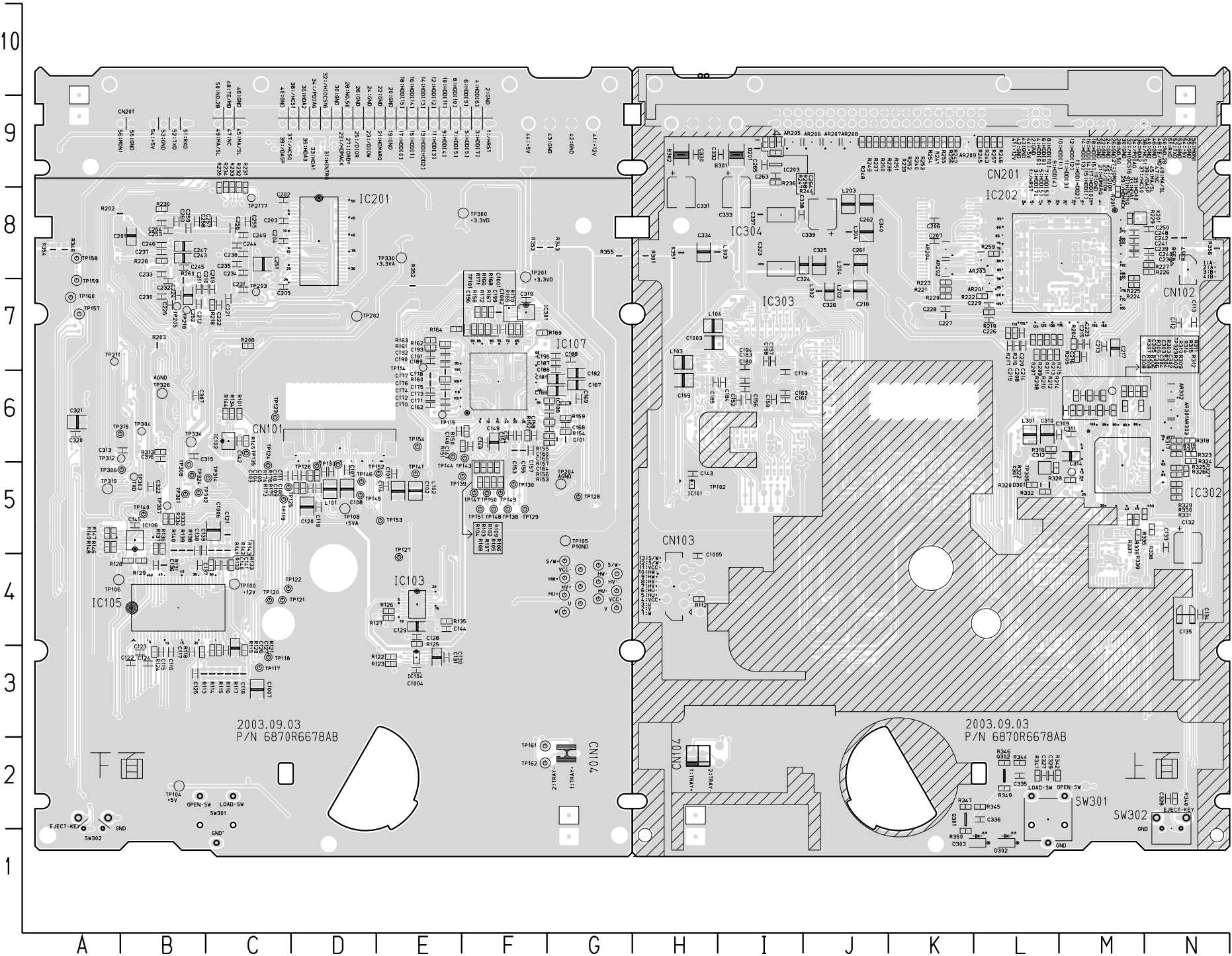


3. μ -COM CIRCUIT DIAGRAM



PRINTED CIRCUIT DIAGRAMS

1. MAIN P.C.BOARD



LOCATION GUIDE

C1001	F7	C174	E6	C1002	C6	R159	G6	TP1123	E6	TP153	E5	TP2178	C8	AR201	L7	C306	M6	R223	K7	R344	L2	TP1220	N5	TP2196	J9	
C1002	F7	C175	E6	C1003	E4	R160	E6	TP1129	F6	TP154	E6	TP2179	C8	AR202	K8	C308	M6	R224	M7	R345	L2	TP1232	M5	TP2197	J9	
C1003	E3	C176	E6	C1004	E3	R161	E7	TP114	F6	TP157	A7	TP2180	C8	AR203	L8	C309	M6	R225	M7	R346	L2	TP1277	I7	TP2198	J9	
C1006	C5	C177	E6	C1005	B4	R162	E7	TP1141	F6	TP158	A8	TP2186	C8	AR204	K8	C310	L6	R226	N8	R347	K2	TP2000	J8	TP2199	J9	
C1007	C3	C178	E6	C1006	B5	R163	E7	TP115	E6	TP159	A7	TP2215	D9	AR205	I9	C311	M6	R227	N8	R349	L2	TP2001	K8	TP2200	J9	
C1008	E5	C179	E6	C1007	F6	R164	E7	TP1152	E3	TP160	A7	TP2216	D9	AR206	J9	C312	L6	R228	M8	R350	K1	TP2002	L8	TP2203	J9	
C102	E5	C182	G6	C1008	G6	R165	F7	TP1156	E4	TP161	F2	TP2217	D9	AR207	J9	C314	M6	R236	I9	R351	H8	TP2003	K8	TP2204	J9	
C103	C5	C186	G7	C1009	D8	R166	F7	TP1157	E4	TP162	F2	TP2218	D9	AR208	J9	C323	I8	R237	J9	R356	N8	TP2005	K8	TP2205	J9	
C104	D5	C187	G7	C1010	F7	R167	F7	TP1159	E4	TP163	G4	TP2219	D9	AR209	K9	C324	J8	R238	K9	R357	N8	TP2006	I9	TP2206	J9	
C105	D5	C188	G7	C1011	D5	R168	F7	TP1167	A7	TP164	G4	TP2220	D9	AR301	N6	C325	J8	R239	K9	R358	N8	TP2011	K8	TP2208	J9	
C106	D5	C189	E7	C1012	E5	R169	F7	TP117	C3	TP165	G4	TP2221	C9	AR302	N6	C326	J7	R240	K9	SW301	L2	TP2013	K8	TP2209	J9	
C107	D5	C190	E7	C1013	E7	R170	F7	TP1178	B3	TP166	G4	TP2222	C9	AR303	N6	C327	L2	R241	K9	SW302	N1	TP2016	K8	TP2210	K9	
C108	D5	C191	E7	C1014	F5	R171	F7	TP118	C3	TP167	G4	TP2240	B7	B301	I9	C328	N2	R242	K9	TP1004	H7	TP2018	K8	TP2211	K9	
C109	D5	C192	E7	C1015	F5	R172	F7	TP1189	B4	TP168	G4	TP2252	A8	B302	H9	C329	L2	R243	L9	TP1008	J6	TP2021	L7	TP2212	K9	
C111	D5	C195	G7	C1016	F5	R173	D5	TP119	C5	TP169	G4	TP2254	B8	C1003	H7	C330	H9	R244	I9	TP1009	J6	TP2022	K7	TP2223	L9	
C114	E5	C196	F7	C1017	R105	F5	R175	D5	TP1192	C4	TP171	G4	TP2259	A8	C112	H7	C332	I9	R246	L9	TP1013	H6	TP2026	K8	TP2244	M8
C115	B3	C197	F7	C1018	R109	F5	R176	D5	TP1194	C4	TP172	G4	TP2263	B8	C113	H7	C333	I8	R247	I9	TP1014	I6	TP2027	K8	TP2247	M8
C116	B3	C198	F7	C1019	R108	F5	R177	D5	TP1195	C4	TP173	G4	TP2265	B8	C114	H7	C334	I8	R248	J9	TP1015	J6	TP2029	K8	TP2258	M8
C117	B3	C202	C8	C1019	F5	R203	B7	TP1197	B4	TP174	G4	TP2271	B8	C133	N5	C335	L2	R249	J9	TP1016	I6	TP2030	K8	TP2269	M8	
C118	C3	C203	C8	C1020	R113	B3	R206	C7	TP1198	B4	TP175	G4	TP2300	F8	C134	N4	C336	L2	R250	J9	TP1018	I6	TP2033	K8	TP2272	M8
C119	D5	C204	C8	C1021	R114	C3	R218	C7	TP120	C4	TP204	C8	TP3000	C6	C135	N4	C337	I8	R251	K9	TP102	H5	TP2033	K8	TP3002	M6
C120	D5	C205	C7	C1023	R115	C3	R228	B8	TP1206	B4	TP207	C8	TP3005	B6	C143	H5	C338	I8	R252	K9	TP1021	J7	TP2035	K8	TP3005	M5
C121	C5	C209	C7	C1024	R116	C3	R230	B8	TP121	C4	TP209	C7	TP301	B5	C150	I6	C339	J8	R253	K9	TP1026	I7	TP2036	K8	TP3009	N5
C122	B3	C210	B7	C1025	R117	C3	R231	C8	TP1217	B4	TP210	F8	TP302	B5	C152	I6	C340	J8	R254	K9	TP1033	I7	TP2039	K8	TP311	N6
C123	B3	C211	B7	C1026	R118	B3	R232	C8	TP1218	B4	TP210	C8	TP303	B5	C156	I6	CN102	N8	R255	K9	TP1033	I7	TP2040	K8	TP313	N6
C124	B3	C212	B7	C1027	R119	C3	R233	C8	TP1219	B4	TP214	C8	TP304	B6	C159	H6	CN103	H4	R256	K9	TP1036	I7	TP2043	K8	TP319	J8
C125	B3	C221	C7	C1028	R120	C3	R234	C8	TP122	C4	TP215	C8	TP306	B5	C161	I6	CN104	H2	R257	L9	TP1038	I7	TP2044	K8	TP320	H8
C126	C3	C222	C7	C1029	R121	C3	R235	C8	TP1221	C4	TP219	C8	TP307	B5	C163	I6	CN201	M9	R258	I9	TP1039	I6	TP2045	K8	TP322	N8
C127	C3	C224	B7	C1030	R122	E3	R260	B7	TP1222	C4	TP202	D7	TP308	B5	C179	I6	D201	I9	R259	L8	TP1040	I7	TP2046	K8	TP323	M6
C128	E4	C225	B7	C1031	R123	E3	R313	B6	TP123	C6	TP2020	C8	TP310	A5	C180	I6	D301	L5	R301	H8	TP1041	I6	TP2047	K7	TP327	N6
C129	E4	C230	B7	C1032	R124	B3	R333	B5	TP1230	B4	TP203	C7	TP312	B6	C183	I6	D302	L1	R302	H8	TP1042	I7	TP2048	K7	TP328	N6
C130	E3	C231	C7	C1033	R125	E4	R334	B5	TP1233	B4	TP204	G5	TP314	C5	C184	I6	D303	L1	R303	M6	TP1043	I6	TP2055	J7	TP329	N6
C131	E3	C232	B7	C1034	R126	E4	R343	B8	TP1234	C6	TP204	D8	TP315	A6	C185	H6	D304	M6	TP1044	I7	TP2056	K7	TP331	N5		
C132	B3	C233	B8	C1035	R127	E4	R348	A8	TP1235	C6	TP205	B7	TP316	B5	C194	I7	CN202	M8	R305	M6	TP1045	I7	TP2057	J7	TP332	N5
C133	B3	C234	B8	C1036	R128	B4	R352	E7	TP1236	C6	TP2063	C7	TP316	B6	C197	I7	CN203	I9	R306	M6	TP1046	I7	TP2060	J7	TP333	N5
C134	B5	C235	C8	C1037	R129	B4	R353	F8	TP124	C5	TP2066	C7	TP318	E8	C198	I7	CN204	M5	R307	M6	TP1047	H5	TP2061	J7	TP337	M5
C135	B5	C237	B8	C1038	R131	B4	R354	A8	TP1243	E3	TP2070	C7	TP318	B6	C206	K8	CN303	I8	R308	M6	TP1050	I7	TP2074	J7	TP338	M5
C140	C4	C238	C8	C1039	R132	C4	R355	B8	TP1248	E3	TP2075	B7	TP316	A5	C207	K8	CN304	I8	R309	M6	TP1052	I6	TP2080	J6	TP344	N6
C141	C4	C243	B8	C1040	R133	C4	TP100	C4	TP125	C5	TP2076	B7	TP319	B5	C208	L7	L103	H7	R310	M6	TP1058	I7	TP2082	M7	TP345	N6
C142	C5	C244	B8	C1041	R134	C5	TP105	G6	TP1251	A5	TP2087	A4	TP310	A2	C213	M7	L104	H7	R311	N6	TP1066	J7	TP2086	M6	TP346	N6
C144	E4	C245	B8	C1042	R135	E4	TP106	E6	TP1251	A5	TP2090	B7	TP316	B6	C214	L7	L202	J7	R312	M6	TP1070	J7	TP2088	M7	TP357	N5
C145	B5	C246	B8	C1043	R136	B5	TP107	E4	TP1255	A5	TP2095	B6	TP317	B6	C215	M7	L203	J8	R314	M6	TP1078	H6	TP2092	M7	TP361	N6
C146	E6	C247	B8	C1044	R137	B5	TP107	F7	TP1256	A5	TP2097	B7	TP318	B6	C216	M7	L204	J8	R315	M6	TP1080	H5	TP2096	M6	TP363	N6
C147	F6	C249	C8	C1045	R138	B5	TP108	E6	TP126	D5	TP210	B7	TP319	B6	C217	M7	L301	L6	R316	N6	TP1081	I6	TP2103	N6	TP365	N6
C148	F6	C251	C8	C1046	R139	B5	TP109	E6	TP127	E4	TP2101	A6	TP318	B6	C218	J7	L302	J7	R317	N6	TP1085	H6	TP2110	I7	TP370	M6
C149	F6	C252	B7	C1047	R140	B5	TP107	E4	TP128	D5	TP2102	A6	TP319	B6	C219	L7	L303	H8	R318	N6	TP1086	I6	TP2111	H7	TP371	M6
C151	F6	C253	B8	C1048	R141	C5	TP109	E6	TP129	F5	TP2105	E6	TP318	C4	C220	L7	L304	J8	R319	N6	TP1091	H6	TP2112	H7	TP372	N6
C153	F6	C254	B8	C1049	R142	C5	TP1025	E7	TP130	F5	TP2106	E6	TP318	B6	C223	M7	D301	K2	R320	L5	TP1092	I6	TP2113	H7	TP373	N6
C154	F6	C255	C8	C1050	R143	C5	TP1027	E7	TP133	D5	TP2108	F7	TP319	B6	C226	L7	D302	L2	R321	N6	TP1093	I6	TP2114	H6	TP374	M6
C155	F6	C256	C8	C1051	R144	C5	TP1028	F7	TP135	D5	TP2109	F7	TP314	C5	C227	K7	R112	H4	R322	L5	TP1095	I7	TP2115	I6	TP375	M6
C157	F6	C257	C8	C1052	R145	C6	TP1029	F7	TP138	F5	TP211	A7	TP315	B5	C228	K7	R201	M8	R323	N6	TP1103	H5	TP2119	L7	TP376	M6
C158	F6	C258	B8	C1053	R146	A5	TP1037	F7	TP139	F5	TP2120	C7	TP317	B5	C229	L7	R204	M7	R324	N6	TP1106	I6	TP2121	K7	TP380	L6
C160	G6	C259	B8	C1054	R147	A5	TP104	B2	TP140	B5	TP2122	C7	TP316	C5	C236	N8	R205	M7	R325	N5	TP1112	H5	TP2126	K7	TP402	L5
C162	E6	C260	B8	C1055	R148	A5	TP1047	F7	TP141	E5	TP2131	C7	TP316	B5	C239	M8	R207	L7	R326	N6	TP1124	I6	TP2130	K7	TP405	J8
C164	G6	C307	B6	C1056	R149	A5	TP105	D5	TP143	D5	TP2134	C7	TP318	B9	C240	N8	R208	L7	R327	N5	TP1126	I6	TP2132	K7	TP408	M5
C168	G6	C319	F7	C1057	R153	G6	TP1075	F6	TP147	F5	TP2146	C8	TP317	E5	C244	N8	R212	L7	R331	N5	TP1134	I6	TP2143	K8	TP420	M5
C169	G6	C320	A6	C1058	R154	C4	TP1076	F6	TP148	F5	TP2147	C8	TP316	B5	C245	J8	R213	L7	R332	L5	TP1135	I6	TP2145	K8	TP421	M5
C170	E6	C321	A6	C1059	R155	G6	TP1077	G6	TP149	F5	TP2148	C8	TP316	B5	C246	N8	R214	L7	R333	N5	TP1136	I6	TP2153	K8	TP430	M5
C171	E6	C322	A6	C1060	R156	G6	TP108	D5	TP150	F5																